

# CCD-TR330E/TR510E

## RMT-713

## SERVICE MANUAL



The remote commander RMT-713 is supplied with the CCD-TR510E but not supplied with the CCD-TR330E.

PHOTO : CCD-TR330E

**AEP Model**  
CCD-TR510E

**UK Model**  
CCD-TR330E/TR510E

**E Model**

**Hong Kong Model**

**Australian Model**

**Tourist Model**  
CCD-TR330E

**Video8**  
**Handycam**

B MECHANISM

• Difference of point

CCD-TR330E	10x Zoom MODEL
CCD-TR510E	24x Zoom MODEL (with STEADY SHOT /WIDE TV)

For MECHANISM ADJUSTMENT, refer to the "8mm Video MECHANICAL ADJUSTMENT MANUAL VII" (9-973-801-11).

### SPECIFICATIONS

#### Video Camera Recorder System

##### Video recording system

Two rotary heads, Helical scanning, FM system

##### Audio recording system

Rotary heads, FM system

##### Video signal

PAL colour, CCIR standards

##### Usable cassette

8 mm video format cassette (standard 8 mm)

##### Tape speed

SP mode: Approx. 20.051 mm (13/16 in)/second

LP mode: Approx. 10.058 mm (13/32 in)/second

##### Recording/Playback time

SP mode: 1 hour and 30 minutes

LP mode: 3 hours

##### Fastforward/rewind time

Approx. 4 min.

##### Image device

CCD (Charge Coupled Device)

##### Viewfinder

Electronic viewfinder

##### Lens

Combined power zoom lens,

CCD-TR330E: F1.6-2.7

CCD-TR510E: F1.8-2.7

Filter diameter 37 mm (1 1/2 inches), TTL autofocus system inner focus wide macro system

CCD-TR330E:

10x

CCD-TR510E:

12x (optical), 24x (digital)

##### Focal distance

CCD-TR330E:

f=6.3-63mm (1/4 - 2 1/2 inches)

45-450 mm (1 1/16 - 17 3/4 inches)

when converted to a 35 mm still camera

CCD-TR510E:

f = 5.4 - 64.8 mm (7/32 - 2 5/8 inches)

39 - 468 mm (1 9/16 - 18 1/2 inches)

when converted to a 35 mm still camera

47 - 564 mm (1 7/8 - 22 1/4 inches)

##### Colour temperature

Auto

##### Minimum illumination

CCD-TR330E:

0.6 lx at F 1.6

CCD-TR510E: 4.0 lx at F 1.8

##### Illumination range

CCD-TR330E: 0.6 to 100,000 lx

CCD-TR510E: 4.0 to 100,000 lx

#### Recommended illumination

More than 100 lx

#### Input and Output connectors

##### Video output

Phono jack, 1 Vp-p, 75  $\Omega$ , unbalanced, sync negative

##### Audio output

Monaural, Phono jack, 327 mV, (at load impedance 47 k $\Omega$ ), impedance less than 2.2 k $\Omega$

##### RFU DC OUT

Special minijack, DC 5 V

##### LANC jack

Stereo-mini-mini-jack ( $\phi$  2.5 mm)

##### MIC jack

Mini-jack, 0.388 mV, low impedance with 2.5 to 3 V DC, output impedance 6.8 k $\Omega$  ( $\phi$  3.5 mm)

#### General

##### Power requirements

On battery mounting surface 6.0 V (battery pack), 7.5 V (AC power adaptor)

##### Average power consumption

CCD-TR330E: 3.8 W

CCD-TR510E: 4.1 W

#### Installation

Vertically, Horizontally

##### Operating temperature

0°C to 40°C (32°F to 104°F)

##### Storage temperature

-20°C to +60°C (-4°F to +140°F)

##### Dimensions

Approx. 110 x 103 x 202 mm (4 3/8 x 4 1/8 x 8 inches) (w/h/d)

##### Mass

CCD-TR330E:

Approx. 690 g (1 lb 8 oz)

CCD-TR510E:

Approx. 700 g (1 lb 9 oz)

Excluding the battery pack, lithium battery, cassette and shoulder strap

CCD-TR330E:

Approx. 910 g (2 lb)

CCD-TR510E:

Approx. 920 g (2 lb 1 oz)

— Continued on next page —



**8 VIDEO CAMERA RECORDER**  
**SONY®**

Including the battery pack NP-33, lithium battery CR2025, cassette P5-90 and shoulder strap

#### Microphone

Electret condenser microphone, monaural type

#### Supplied accessories

See page 2.

#### AC power adaptor

##### Power requirements

110 – 240 V AC, 50/60Hz

##### Power consumption

18 W

##### Output voltage

DC OUT in operation mode:

7.5 V, 1.6 A

Battery charge terminal: 10 V,

1.1 A in charge mode

##### Application

Sony battery packs NP-33, NP-55H, NP-65, NP-66H, NP-67, NP-68, NP-77H, NP-77HD, NP-90/90D, NP-98/98D

##### Operating temperature

0°C to 40°C (32°F to 104°F)

##### Storage temperature

–20°C to +60°C (–4°F to +140°F)

##### Dimensions

Approx. 166 x 43 x 75 mm (6 <sup>5</sup>/<sub>8</sub>

x 1 <sup>11</sup>/<sub>16</sub> x 3 inches) (w/h/d)

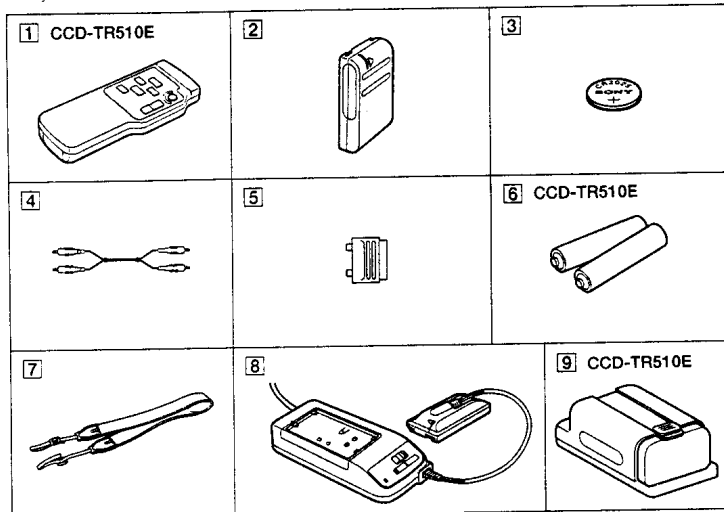
including projecting parts and controls

##### Mass

Approx. 420 g (15 oz)

## Checking Supplied Accessories

Check that the following accessories are supplied with your camcorder.



- 1 Wireless Remote Commander (1)
- 2 NP-33 Battery Pack (1)
- 3 CR2025 Lithium Battery (1)  
Already installed in the camcorder.
- 4 A/V connecting cable (1)
- 5 21-pin adaptor (1)
- 6 R6 (size AA) battery for Remote Commander (2)
- 7 Shoulder strap (1)
- 8 AC-16/V15/V16 AC power adaptor
- 9 Battery case (1)

### SAFETY-RELATED COMPONENT WARNING!!

**COMPONENTS IDENTIFIED BY MARK OR DOTTED LINE WITH MARK ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.**

#### • Difference of point

CCD-TR330E	10× Zoom MODEL
CCD-TR510E	24× Zoom MODEL (with STAEDY SOHT /WIDE TV )

#### • Repair parts list is omitted except the followings.

10× Zoom MODEL	: ×10 MODEL
24× Zoom MODEL (with STAEDY SOHT /WIDE TV )	: ×24 MODEL

## SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer.

- Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
- Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
- Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
- Look for parts which, through functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
- Check the B+ voltage to see it is at the values specified.
- Flexible Circuit Board Repairing
  - Keep the temperature of the soldering iron around 270°C during repairing.
  - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
  - Be careful not to apply force on the conductor when soldering or unsoldering.

## TABLE OF CONTENTS

### SERVICE NOTE .....5

### 1. GENERAL

Checking Your Model Number .....	1-1
Getting Started	
Charging and Installing the Battery Pack.....	1-1
Inserting a Cassette .....	1-3
Basic Operations	
Camera Recording .....	1-4
Hints for Better Shooting .....	1-6
Checking the Recorded Picture .....	1-7
Connections for Playback .....	1-8
Playing back a Tape .....	1-9
Advanced Operations	
Using Alternate Power Sources .....	1-10
Recording with the Date or Time.....	1-12
Shooting with Backlighting .....	1-12
Using the PROGRAM AE function.....	1-13
Shooting Scenery in Several Short Takes .....	1-14
Superimposing a Title .....	1-14
Using the Wide Mode function .....	1-15
Using the STEADY SHOT function .....	1-15
Changing the Mode Settings .....	1-16
Editing onto Another Tape .....	1-16
Additional Information	
Changing the Lithium Battery in the Camcorder.....	1-17
Resetting the Date and Time .....	1-18
Playback Modes .....	1-18
Tips for Using the Battery Pack .....	1-18
Maintenance Information and Precautions .....	1-21
Using Your Camcorder Abroad .....	1-24
Identifying the Parts .....	1-25
Warning Indicators .....	1-30

### 2. DISASSEMBLY

2-1. REMOVAL OF F PANEL ASSY, MA-238 BOARD and MICROPHONE .....	2-1
2-2. REMOVAL OF CABINET ASSY .....	2-1
2-3. REMOVAL OF CASSETTE LID ASSY, LS LID, JK-129 and TZ-3 BOARD .....	2-2
2-4. REMOVAL OF DD-80P BOARD .....	2-2
2-5. REMOVAL OF ZOOM LENS and CD-139 BOARD .....	2-3
2-6. REMOVAL OF VC-167P BOARD .....	2-3
2-7. REMOVAL OF CF-40 BOARD .....	2-4
2-8. REMOVAL OF PW-108 BOARD .....	2-4
2-9. REMOVAL OF EVF BLOCK ASSY .....	2-5
2-10. REMOVAL OF CRT ASSY and VF-87P BOARD.....	2-5
2-11. INTERNAL VIEWS.....	2-6
2-12. CIRCUIT BOARDS LOCATION .....	2-7

### 3. BLOCK DIAGRAMS

3-1. OVERALL BLOCK DIAGRAM.....	3-1
3-2. CAMERA BLOCK DIAGRAM .....	3-4
3-3. VIDEO/AUDIO BLOCK DIAGRAM.....	3-7
3-4. SYSTEM CONTROL BLOCK DIAGRAM .....	3-11
3-5. SERVO BLOCK DIAGRAM .....	3-13
3-6. MODE CONTROL/EVF BLOCK DIAGRAM .....	3-16
3-7. POWER BLOCK DIAGRAM .....	3-19

### 4. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. FRAME SCHEMATIC DIAGRAM .....	4-1
4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS .....	4-4
· VC-167P(CAMERA 1), CD-139(CCD IMAGER) SCHEMATIC DIAGRAMS .....	4-5
· VC-167P(CAMERA 2)SCHEMATIC DIAGRAM .....	4-7
· VC-167P(CAMERA 3)SCHEMATIC DIAGRAM .....	4-10
· VC-167P(VIDEO 1)SCHEMATIC DIAGRAM .....	4-13
· VC-167P(VIDEO 2), JK-129(JACK) SCHEMATIC DIAGRAMS .....	4-16
· VC-167P(MODE CONTROL), FP-249(MODE SENSOR) SCHEMATIC DIAGRAMS .....	4-19
· VC-167P(AUDIO AMP), MA-238(AUDIO) SCHEMATIC DIAGRAMS .....	4-22
· MA-238(AUDIO)PRINTED WIRING BOARD .....	4-25
· DD-80P(POWER)PRINTED WIRING BOARD .....	4-27
· DD-80P(POWER), VC-167P(VTR SWITCH) SCHEMATIC DIAGRAMS .....	4-29
· FP-249(MODE SENSOR) PRINTED WIRING BOARD .....	4-32
· VC-167P(MAIN)PRINTED WIRING BOARD .....	4-35
· CF-40(SYSTEM CONTROL), PW-108(POWER SWITCH) PRINTED WIRING BOARDS .....	4-40
· CF-40(SYSTEM CONTROL), PW-108(POWER SWITCH) SCHEMATIC DIAGRAMS .....	4-43
· VF-87P(EVF), JK-129(JACK), CD-139(CCD IMAGER) PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM .....	4-46
· VF-87P(EVF), SCHEMATIC DIAGRAM .....	4-49
· TZ-3(STEADY SHOT) PRINTED WIRING BOARD .....	4-51
· TZ-3(STEADY SHOT) SCHEMATIC DIAGRAM .....	4-53

## 5. REPAIR PARTS LIST

5-1. EXPLODED VIEWS	5-1
5-1-1. OVERALL SECTION	5-1
5-1-2. CABINET(L), F PANEL SECTION	5-2
5-1-3. CABINET(R) SECTION	5-3
5-1-4. EVF SECTION	5-4
5-1-5. MAIN SECTION	5-5
5-1-6. CASSETTE COMPARTMENT BLOCK SECTION	5-6
5-1-7. LS CHASSIS BLOCK SECTION	5-7
5-1-8. MECHANISM CHASSIS BLOCK SECTION	5-8
5-2. ELECTRICAL PARTS LIST	5-9

## 6. ADJUSTMENTS

6-1. CAMERA SECTION ADJUSTMENT	6-1
1-1. PREPARATIONS BEFORE ADJUSTMENT	6-1
1-1-1. List of service tools	6-1
1-1-2. Precautions	6-2
1. Switch settings	6-2
2. Adjustment sequence	6-2
3. Subject	6-2
1-1-3. Preparations	6-3
1-1-4. Adjustment remote commander (RM-95 upgraded)	6-4
1. Using the adjustment remote commander	6-4
2. Precautions when using the adjustment remote commander	6-5
1-2. CAMERA SYSTEM ADJUSTMENTS	6-8
1. Adjustment points when major parts have been replaced	6-8
2. Power supply voltage check (VC-167P board)	6-8
3. Preparation for adjustment	6-8
4. Initialization of page F data	6-9
5. V SUB adjustment	6-10
6. VRG adjustment	6-10
7. Page F data modification	6-11
8. 28MHz crystal oscillator adjustment	6-12
9. HALL adjustment	6-14
10. Flange back adjustment	6-16
11. Flange back check	6-17
12. Picture frame setting	6-18
13. Color reproduction adjustment	6-19
14. IRIS IN/OUT adjustment	6-20
15. MAX gain adjustment	6-21
16. Auto white balance reference data input	6-22
17. Auto white balance adjustment	6-23
18. White balance check	6-24
19. Camera-shaking correction adjustment	6-25
20. Electronic viewfinder system adjustments (VF-87P board)	6-26
20-1. Power supply voltage check	6-26
20-2. Horizontal and vertical position	6-26
20-3. BRIGHT adjustment	6-26
20-4. Centering adjustment	6-27
20-5. Focus adjustment	6-27
20-6. Diffraction adjustment	6-27

6-2. MECHANISM SECTION ADJUSTMENTS	6-31
2-1. HOW TO OPERATE THE MECHANISM AFTER THE CASSETTE COMPARTMENT IS REMOVED	6-31
1. How to load a cassette tape	6-31
2. How to establish RECORD mode	6-31
3. How to eject a cassette tape	6-31
4. Processing after operation	6-31
2-2. TAPE PATH ADJUSTMENT	6-32
1. Preparations for adjustments	6-32
6-3. VIDEO SECTION ADJUSTMENT	6-33
3-1. PREPARATIONS BEFORE ADJUSTMENT	6-34
3-1-1. Equipment required	6-34
3-1-2. Precautions on adjustment	6-34
3-1-3. Adjustment connector (VC-167P Board CN102)	6-34
3-1-4. Equipment connection	6-35
3-1-5. Alignment tape	6-35
3-1-6. Output level and impedance	6-36
3-2. ADJUSTMENT POINTS WHEN MAJOR PARTS ARE REPLACED	6-37
3-3. POWER SUPPLY SYSTEM ADJUSTMENT	6-37
1. Power supply voltage check (VC-167P board)	6-37
2. VTR & CAM mode ON	6-38
3. EMG code (Emergency code)	6-39
4. MSW code	6-39
5. Bit value discrimination	6-40
6. Initializing the emergency code area	6-41
7. LED check	6-41
8. Key input check	6-42
9. Key input check (A/D port)	6-42
10. Individual operation of drum, capstan and loading motor	6-43
3-4. SERVO SYSTEM ADJUSTMENTS	6-44
1. SYNC level and BURST level adjustments	6-44
2. Switching position adjustment	6-45
3. Capstan FG offset adjustment	6-46
3-5. PLAYBACK FREQUENCY RESPONSE CHARACTERISTICS ADJUSTMENT	6-47
3-6. DEMD OUT LEVEL ADJUSTMENT	6-48
3-7. YD OUT ADJUSTMENT	6-49
3-8. PB CHROMA LEVEL CHECK	6-50
3-9. PB Y OUT LEVEL ADJUSTMENT	6-51
3-10. FE OSC CHECK	6-52
3-11. EMPHASIS INPUT LEVEL ADJUSTMENT	6-53
3-12. Y FM DEVIATION ADJUSTMENT	6-54
3-13. Y FM CARRIER FREQUENCY ADJUSTMENT	6-55
3-14. CHROMA EMPHASIS $f_0$ ADJUSTMENT	6-56
3-15. REC Y LEVEL ADJUSTMENT	6-57
3-16. REC L LEVEL ADJUSTMENT	6-58
3-17. REC C LEVEL ADJUSTMENT	6-59
6-4. AUDIO SYSTEM ADJUSTMENT	6-60
4-1. EE-OUTPUT LEVEL CHECK	6-60
4-2. 1.5MHz DEVIATION ADJUSTMENT	6-61
4-3. BPF $f_0$ ADJUSTMENT	6-62
4-4. OVERALL SIGNAL LEVEL AND DISTORTION CHECK	6-63
4-5. OVERALL NOISE LEVEL CHECK	6-63

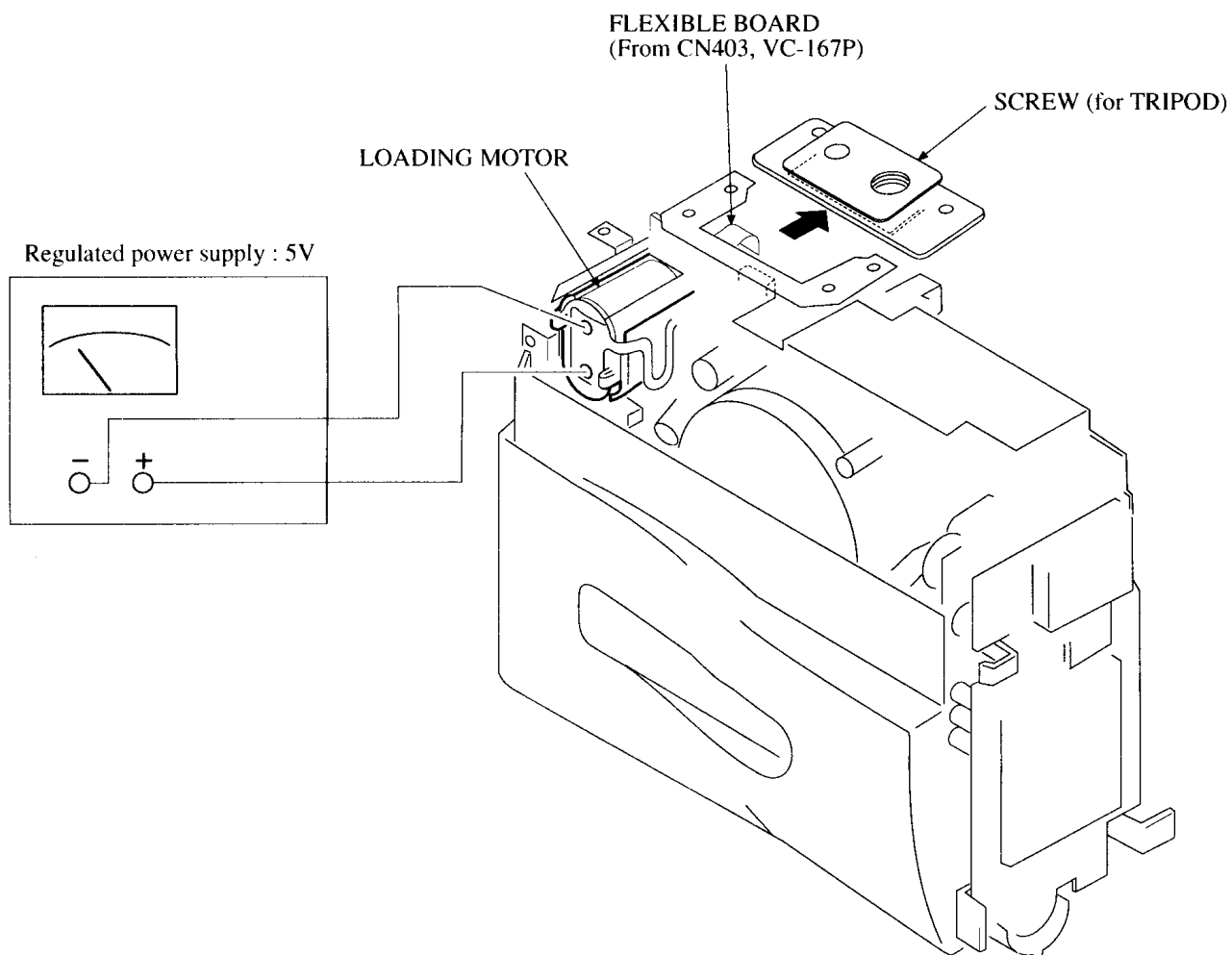
※ The color reproduction frame is shown after the page of  
ARRANGEMENT DIAGRAM FOR ADJUSTMENT PARTS.



## SERVICE NOTE

- How to remove cassette if the main power cannot be switched ON. (Forced EJECT)

NOTE : To eject a cassette from the camcorder without turning on the main power, firstly remove the SCREW (for TRIPOD), then remove the FLEXIBLE BOARD as shown, and finally connect the regulated power supply ; +5V to the loading motor, this is to protect the main circuit from damage.



## Checking Your Model Number

The instructions in this manual are for four models listed below. Before you start reading and operating, check your model number by looking at the bottom of your camcorder. The CCD-TR420E is the model used for illustration purposes. Otherwise, the model name is indicated in the illustrations. Any differences in operation are clearly indicated in the text, for example, "For CCD-TR510E only".

As you read through this manual, buttons and settings on the camcorder are shown in capital letters. e.g. Set the POWER switch to CAMERA.

## Comprobación del nombre de su modelo

Las instrucciones de este manual abarcan los cuatro modelos de la tabla siguiente. Antes de leer el manual y utilizar la videocámara, vea el nombre de su modelo en la base de la misma. Las ilustraciones de este manual son de la CCD-TR420E. Pero cuando sean de la otra, su nombre de modelo se indicará en la ilustración. Cualquier diferencia en cuanto a la operación, se indicará claramente en el texto, por ejemplo, "Para la CCD-TR510E solamente".

Las teclas y ajustes de la videocámara aparecen en mayúsculas en todo el manual. Ej. Ponga el selector POWER en CAMERA.

### Types of Differences

Model	Remote Commander	Viewfinder	Zoom	Wide TV	Steady Shot
Modelo	Telemando	Visor	Zoom	Televisor panorámico	Filmación estable
CCD-TR410E		Black and white Blanco y negro	12x 12x ↔ 24x		
CCD-TR420E	●	●	●		
CCD-TR440E	●	●	●		
CCD-TR510E	●	●	●	●	●

Contents of the recording cannot be compensated if recording or playback is not made due to a malfunction of the camcorder, video tape, etc.

El contenido de la grabación no puede ser compensado si la grabación o la reproducción no ha sido posible debido al mal funcionamiento de la videocámara, videocassette etc.

### Getting Started

## Charging and Installing the Battery Pack

Before using your camcorder, you first need to charge and install the battery pack. To charge the battery pack, use the supplied AC-V15 AC power adaptor.

### Charging the Battery Pack

Charge the battery pack on a flat place without vibration.

- (1) Connect the AC power adaptor to the mains.
- (2) Align the right side of the battery pack with the line on the AC power adaptor, then slide the battery pack in the direction of the arrow.
- (3) Set the selector to CHARGE. The CHARGE lamp (orange) lights up. Charging begins.

When charging is completed, the CHARGE lamp goes out. Unplug the unit from the mains, and then remove the battery pack and install it on the camcorder.

### Preparativos

## Carga y fijación de la batería

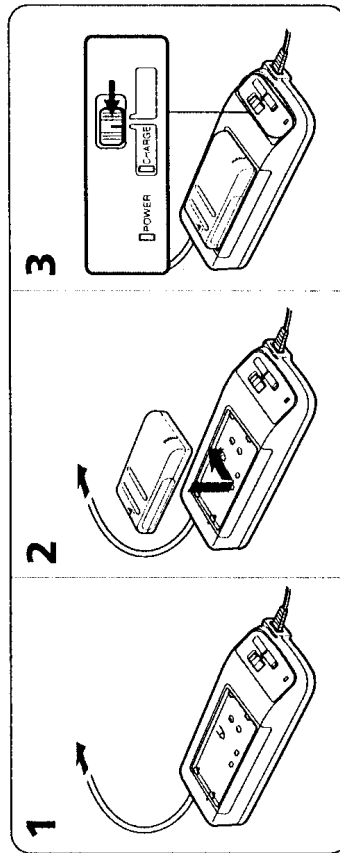
Antes de utilizar la videocámara, primero tendrá que cargar y colocar la batería. Para cargar la batería, utilice el adaptador de alimentación de CA AC-V15 suministrado.

### Carga de la batería

Cargue la batería en un lugar nivelado y exento de vibraciones.

- (1) Conecte el adaptador de alimentación de CA a una toma de la red.
- (2) Alinee el lado derecho de la batería con la línea del adaptador de alimentación de CA, y después deslice la batería en el sentido de la flecha.
- (3) Ponga el selector en CHARGE. La lámpara CHARGE (anaranjada) se encenderá y se iniciará la carga.

Cuando finalice la carga, la lámpara CHARGE se apagará. Desconecte la unidad de la toma de la red, y después quite la batería y fíjela a la videocámara.



### Charging Time

Battery pack	Charging time*
NP-33 (supplied)	60
NP-55H	85
NP-65/67	105
NP-66H/68	125
NP-77H/77HD	170
NP-90/90D/98/98D	215

\* Approximate minutes to charge an empty pack using the AC-V15 (Lower temperatures require a longer charging time.)

### Tiempo de carga

Batería	Tiempo de carga*
NP-33 (suministrada)	60
NP-55H	85
NP-65/67	105
NP-66H/68	125
NP-77H/77HD	170
NP-90/90D/98/98D	215

\* Minutos aproximados para cargar una batería agotada utilizando el AC-V15. (A bajas temperaturas, el tiempo de carga será más largo.)

## SECTION 1 GENERAL

This section is extracted from combined instruction manual of models  
CCD-TR410E/TR420E/TR440E/TR510E.

This service manual can be applied to  
only CCD-TR510E.

Getting Started Preparativos

## Charging and Installing the Battery Pack

### Battery Life

CCD-TR410E/TR420E

Battery pack	Typical recording time**	Continuous recording time***
NP-33 (Supplied)	35	70
NP-55H	50	95
NP-65/67	65	125
NP-66H/68	85	155
NP-77H/77HD	115	205
NP-90/90D/98/98D	145	260

### CCD-TR440E

Battery pack	Typical recording time**	Continuous recording time***
NP-33 (Supplied)	35	65
NP-55H	45	90
NP-65/67	60	120
NP-66H/68	75	150
NP-77H/77HD	110	200
NP-90/90D/98/98D	135	245

### CCD-TR510E

Battery pack	Typical recording time**	Continuous recording time***
NP-33 (Supplied)	35	65
NP-55H	45	90
NP-65/67	60	120
NP-66H/68	75	145
NP-77H/77HD	105	195
NP-90/90D/98/98D	130	240

\*\* Approximate minutes when recording while you repeat recording start/stop, zooming and turning the power on/off. The actual battery life may be shorter.

\*\*\* Approximate continuous recording time indoors.

## Carga y fijación de la batería

### Duración de la batería

CCD-TR410E/TR420E

Batería	Tiempo de videofilmación típica**	Tiempo de videofilmación continua***
NP-33 (suministrada)	35	70
NP-55H	50	95
NP-65/67	65	125
NP-66H/68	85	155
NP-77H/77HD	115	205
NP-90/90D/98/98D	145	260

### CCD-TR440E

Batería	Tiempo de videofilmación típica**	Tiempo de videofilmación continua***
NP-33 (suministrada)	35	65
NP-55H	45	90
NP-65/67	60	120
NP-66H/68	75	150
NP-77H/77HD	110	200
NP-90/90D/98/98D	135	245

### CCD-TR510E

Batería	Tiempo de videofilmación típica**	Tiempo de videofilmación continua***
NP-33 (suministrada)	35	65
NP-55H	45	90
NP-65/67	60	120
NP-66H/68	75	145
NP-77H/77HD	105	195
NP-90/90D/98/98D	130	240

\*\* Minutos aproximados cuando videofilme repitiendo el inicio/la parada de la grabación, el zoom y la conexión/desconexión de la alimentación. Es posible que la duración de la batería actual sea más corta.

\*\*\* Tiempo aproximado de videofilmación continua en interiores.

### Important!

#### Use the battery completely before re-charging!

Before you recharge the battery, make sure the battery has been used up (discharged) completely.

Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.

To use up the battery, remove the cassette and turn the POWER switch to CAMERA with the battery attached, and leave the camcorder until the CS indicator and the red lamp flash rapidly in the viewfinder.

### ¡Importante!

#### ¡Utilice completamente la batería antes de recargarla!

Antes de recargar la batería, asegúrese de que la batería esté completamente agotada (descargada).

La carga repetida sin la batería completamente descargada hará que la capacidad de la misma disminuya. Sin embargo, será posible recuperar la capacidad original de la batería si la vuelve a utilizar y cargar por completo.

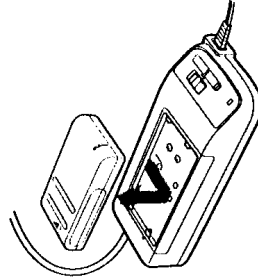
Para utilizar la batería completamente, extraiga el videocassette, gire el selector POWER hasta CAMERA, y con la batería fijada deje la videocámara hasta que en el visor parpadeen rápidamente el indicador CS y la lámpara roja.

### Para quitar la batería

Deslicela en el sentido de la flecha.

### Removing the Battery Pack

Slide the battery pack in the direction of the arrow.



### Notes on charging the battery pack

- The POWER lamp will remain lit for a while even if the battery pack is removed and the mains lead is unplugged after charging the battery pack. This is normal.
- If the POWER lamp does not light, set the selector to VTR (DC OUT) and disconnect the mains lead. After about one minute, reconnect the mains lead and set the selector to CHARGE again.
- You cannot operate the camcorder using the AC power adaptor while charging the battery pack.

### Notas sobre la carga de la batería

- Es normal que la lámpara POWER permanezca encendida durante un momento después de que haya quitado la batería y desconectado el cable de alimentación cuando finalice la carga.
- Si la lámpara POWER no se enciende, ponga el selector en VTR (DC OUT) y desconecte el cable de alimentación. Después de aproximadamente un minuto, vuelva a conectar el cable y a poner el selector en CHARGE.
- No podrá operar la videocámara empleando el adaptador de alimentación de CA mientras esté cargando la batería.



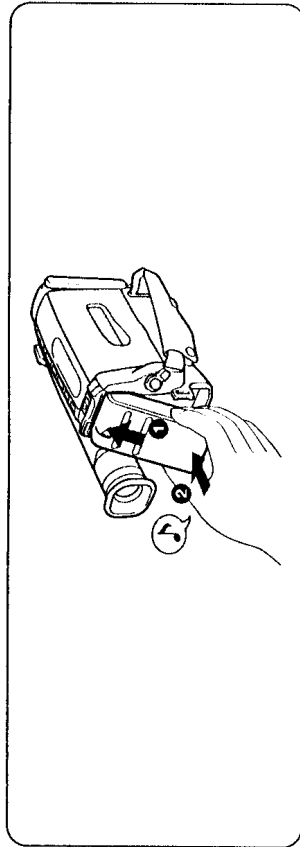
## Charging and Installing the Battery Pack

### Carga y fijación de la batería

#### Installing the Battery Pack

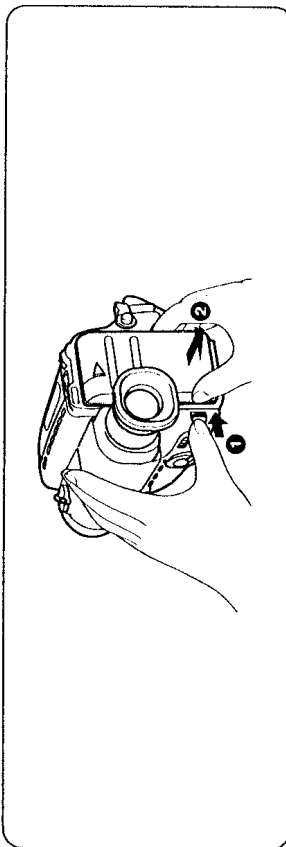
- (1) Insert the top of the battery pack into the top of the battery mounting surface.
- (2) Push the battery pack so that it attaches firmly.

♫: You can hear the beep sound to confirm your operation.



#### Removing the Battery Pack

Slide BATT, and then pull the lower part of the battery pack.



#### Para quitar la batería

Deslice BATT, y después tire de la parte inferior de la batería.

#### Fijación de la batería

- (1) Inserte la cabeza de la batería en la parte superior de la superficie de montaje.
- (2) Empuje la batería de forma que ésta quede firmemente fijada.

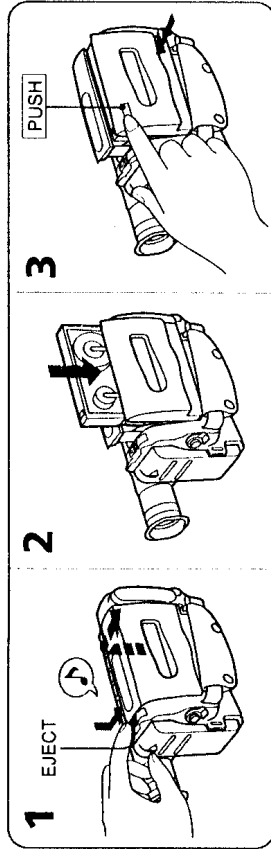
♫: Usted podrá oír un pitido para confirmar su operación.

## Inserting a Cassette

Make sure that a power source is installed.

- (1) While pressing the small blue button, slide EJECT in the direction of the arrow. The cassette compartment automatically opens.
- (2) Insert a cassette (not supplied) with the window facing out.
- (3) Press the PUSH mark on the cassette compartment to close it. The cassette compartment automatically closes.

♫: You can hear the beep sound to confirm your operation.



#### To Eject the Cassette

While pressing the small blue button, slide EJECT in the direction of the arrow.

#### To Prevent Accidental Erasure

Slide the tab on the cassette to expose the red mark.

If you insert the cassette with the red mark exposed and close the cassette compartment, the beeps sound for a while. If you try to record with the red mark exposed, the and indicators flash in the viewfinder, and you cannot record on the tape. To re-record on this tape, slide the tab back out to cover the red mark.

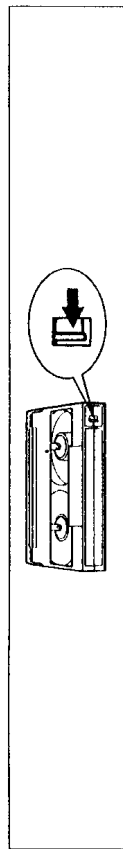
#### Para expulsar el videocassette

Manteniendo presionado el pequeño botón azul, deslice EJECT en el sentido de la flecha.

#### Para prevenir el borrado accidental

Deslice la lengüeta del videocassette de forma que la marca roja quede al descubierto.


Si inserta un videocassette con la marca roja al descubierto y cierra el compartimiento del videocassette, sonará un pitido durante un momento. Si intenta grabar con la marca roja al descubierto, en el visor parpadearán los indicadores y , y no podrá grabar. Para volver a grabar en esta cinta, deslice la lengüeta de forma que se cubra la marca roja.




Make sure that a power source and a cassette is inserted.

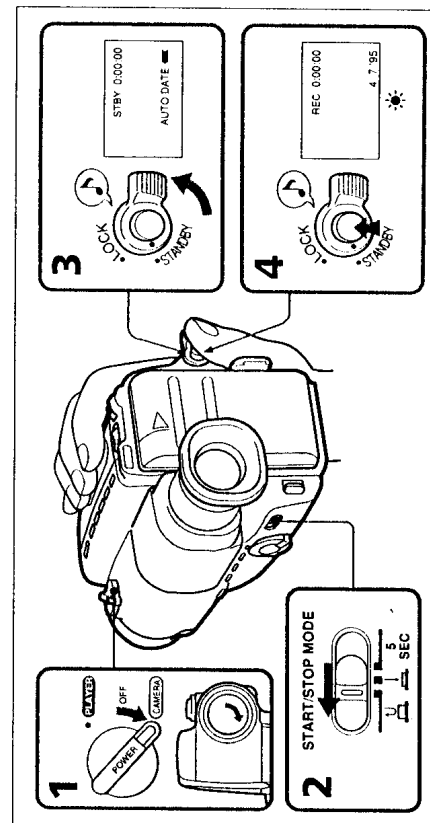
When you use the camcorder for the first time, power on it and reset the date and time to your time (p. 40) before you start recording. When you reset the date and time, the date is automatically recorded for 10 seconds after you start recording (AUTO DATE feature). This feature works only once a day.

Before you record one-time events, you may want to make a trial recording to make sure that you are using the camcorder correctly.

- (1) While pressing the small green button on the POWER switch, turn it to CAMERA.
- (2) Slide the START/STOP MODE switch to .
- (3) Turn STANDBY up. The "STBY" indicator appears in the viewfinder.
- (4) Press START/STOP (red button). The camcorder starts recording and the "STBY" indicator changes to the "REC" indicator.

You can also select Recording mode, SP (standard play) mode or LP (long play) mode. Set REC MODE (P. 36) according to the length of your planned recording before you start.


 You can hear the beep sound to confirm your operation.




Asegúrese de que haya una fuente de alimentación conectada y un videocasete insertado.

Cuando utilice la videocámara por primera vez, conecte la alimentación y reajuste la fecha y la hora actual (pág. 40). Cuando las reajuste, la fecha se grabará automáticamente durante 10 segundos a partir del inicio de la videofilmmación [función AUTO DATE (grabación automática de la fecha)]. Esta función sólo trabajará una vez al día.

Antes de realizar videofilmmaciones irrepetibles, se recomienda realizar una filmmación de prueba a fin de comprobar si la videocámara funciona correctamente.

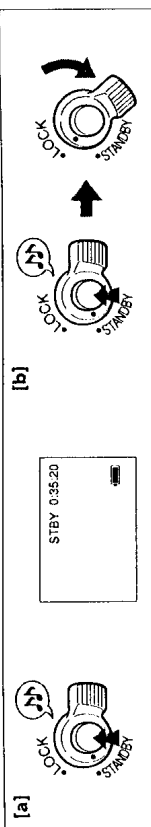
- (1) Manteniendo presionado el pequeño botón verde en el selector POWER, gírelo hasta CAMERA.
- (2) Deslice el selector START/STOP MODE hasta .
- (3) Gire STANDBY hacia arriba. En el visor aparecerá el indicador "STBY".
- (4) Presione START/STOP (tecla roja). La videocámara comenzará a grabar y el indicador "STBY" cambiará a "REC".

Usted también podrá seleccionar el modo de grabación, modo SP (reproducción normal) o LP (reproducción larga). Ajuste REC MODE (pág. 36) de acuerdo con la duración de la filmmación planeada antes de comenzar.

 Usted podrá oír un pitido para confirmar su operación.

**To Stop Recording Momentarily [a]**  
Press START/STOP again. The "REC" indicator in the viewfinder changes to the "STBY" indicator (Standby mode).

**To Finish Recording [b]**  
Press START/STOP. Turn STANDBY down, and set the POWER switch to OFF. Then, eject the cassette (p. 11) and remove the battery (p. 10).

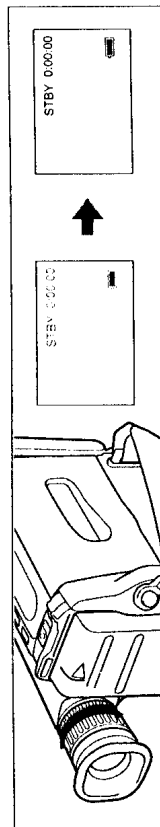


#### Note on Standby mode

If you leave the camcorder for 5 minutes or more with a cassette inserted in Standby mode, the camcorder goes off automatically. This prevents wearing down the battery and wearing out the tape. To resume Standby mode, turn STANDBY down once and turn it up again. To start recording, press START/STOP.

#### To Focus the Viewfinder Lens

If the viewfinder is not in focus at all or when you use the camcorder after someone else has used it, focus the viewfinder lens. Turn the viewfinder lens adjustment ring so that the indicators in the viewfinder come into sharp focus.

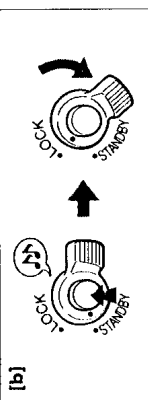


**Note on the indicators in the viewfinder**  
The indicators appear in CAMERA mode only. They do not appear in PLAYER mode.

**Note sobre los indicadores en el visor**  
Los indicadores aparecerán solamente en el modo CAMERA. Éstos no aparecerán en el modo PLAYER.

**Para detener momentáneamente la grabación [a]**  
Presione otra vez START/STOP. El indicador "REC" cambiará al indicador "STBY" (Modo de espera).

**Para finalizar la grabación [b]**  
Presione START/STOP, gire STANDBY hacia abajo y ponga el selector POWER en OFF. Después extraiga el videocasete (pág. 11) y quite la batería (pág. 10).

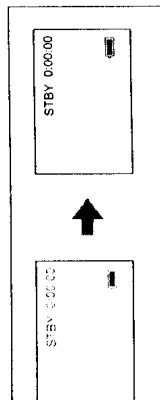


#### Nota sobre el modo de espera

Si deja la videocámara en el modo de espera durante 5 minutos o más con el videocasete insertado, la videocámara se apagará automáticamente. Esto evitará que la batería y el videocasete se desgasten. Para restablecer el modo de espera, gire una vez STANDBY hacia abajo y después otra vez hacia arriba. Para comenzar a grabar, presione START/STOP.

#### Para enfocar la lente del visor

Cuando el visor no esté enfocado en absoluto, o cuando vaya a utilizar la videocámara después de haberla empleado otra persona, enfoque la lente del visor. Gire el anillo de ajuste de la lente del visor de forma que los indicadores del visor queden nítidamente enfocados.



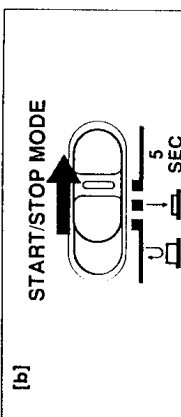
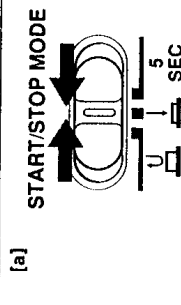
**Note sobre los indicadores en el visor**  
Los indicadores aparecerán solamente en el modo CAMERA. Éstos no aparecerán en el modo PLAYER.

### Recording with the START/STOP button depressed

You can also make recording while pressing down the START/STOP button. To make the START/STOP button work this way, slide the START/STOP MODE switch to **[a]**.

### Shooting scenery in several short takes

You can automatically make recording for about 5 seconds with the 5 SEC (p. 32). To make the START/STOP button work this way, slide the START/STOP MODE switch to 5 SEC. **[b]**



### Note on recording

When you record from the beginning of the tape, run the tape for about 15 seconds before actual recording. This prevents the camcorder from missing any start-up scenes when you play back the tape.

### Recording mode

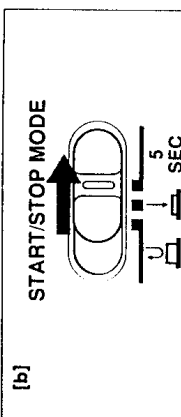
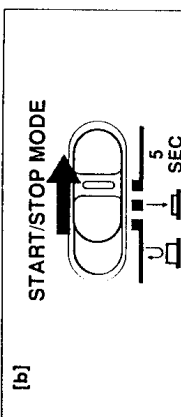
This camcorder records in the SP mode (approximately 20,051 mm/second) and in the LP mode (approximately 10,058 mm/second) (p. 36) and can play back in the SP mode and LP mode. The playback quality in the LP mode, however, will not be as good as that in the SP mode.

### Notes on the tape counter

- The tape counter indicates the recording time. Use it as a guide. There will be a time lag of several seconds from the actual time. To set the counter to zero, press COUNTER RESET located below the viewfinder.
- If the tape is recorded in SP and LP modes mixed, the tape counter shows incorrect recording time. When you intend to edit the tape using the tape counter, record in same (SP or LP) mode.

**Grabación con la tecla START/STOP presionada**  
Usted también podrá grabar presionando la tecla START/STOP. Para hacer funcionar la tecla START/STOP de esta manera, deslice el selector START/STOP MODE hasta **[a]**.

**Videofilación de escenas en varias tomas cortas**  
Utilizando 5 SEC (pág.32), podrá videofilmar automáticamente durante unos 5 segundos. Para que la tecla START/STOP funcione de esta manera, deslice el selector START/STOP MODE hasta 5 SEC. **[b]**



### Nota sobre la grabación

Cuando grabe desde el comienzo de la cinta, haga que ésta avance unos 15 segundos antes de comenzar la videofilación actual. Esto evitará que se pierdan las escenas iniciales cuando se reproduzca la cinta.

### Modo de grabación

Esta videocámara graba en los modos SP (aproximadamente 20,051 mm/segundo) y LP (aproximadamente 10,058 mm/segundo) (pág. 36) y reproduce en ambos modos. Sin embargo, la calidad de las imágenes reproducidas en el modo LP no será tan buena como en el modo SP.

### Notas sobre el contador de la cinta

- El contador de la cinta indicará el tiempo de grabación. Empleelo como una guía. Es posible que exista una diferencia de varios segundos del tiempo real. Para ajustar el contador a cero, presione COUNTER RESET situada debajo del visor.
- Si la cinta se ha grabado en los modos SP y LP mezclados, el contador de la cinta indicará un tiempo de videofilación incorrecto. Cuando intente editar la cinta utilizando el contador de la cinta, grabe en el mismo modo (SP o LP).

### Note on beep sound

As indicated with **[b]** in the illustrations, a beep sounds when you turn the power on or when you start recording and two beeps sound when you stop recording, confirming the operation. Several beeps also sound as a warning of any unusual condition of the camcorder (p. 70). Note that the beep sound is not recorded on the tape. If you do not want to hear the beep sound, set BEEP to "OFF" (p. 36).

### Note on the AUTO DATE feature

The clock is set to London for the United Kingdom models and Paris for other European models at the factory. You can reset the clock (p. 40).

The AUTO DATE feature works once a day.

However, the date may automatically appear more than once a day when:

- you reset the date and time.
- you eject and insert the cassette again.
- you stop recording within 10 seconds.

### When moving from indoors to outdoors (or vice versa)

Turn STANDBY up and point the camcorder at a white object for about 15 seconds so that the white balance is properly adjusted.

### Nota sobre el pitido

Como se indica con **[b]** en las ilustraciones de este manual, cuando conecte la alimentación o cuando comience la videofilación, sonará un pitido, y cuando pare la videofilación sonarán dos pitidos para confirmar la operación. También sonarán varios pitidos como advertencia de una condición anormal de la videocámara (pág. 70). Tenga en cuenta que los pitidos no se grabarán en la cinta. Si no desea oír los pitidos, ponga BEEP en "OFF" (pág. 36).

### Nota sobre la función AUTO DATE

El reloj está ajustado en fábrica a la hora de Londres en los modelos destinados al Reino Unido y a la de París en otros modelos europeos. El reloj puede reajustarse (pág. 40).

La función AUTO DATE se activará una vez al día. Sin embargo, la fecha aparecerá automáticamente más de una vez al día cuando:

- reajuste la fecha y la hora.
- extraiga y vuelva a insertar el videocassette.
- pare la grabación antes de 10 segundos.

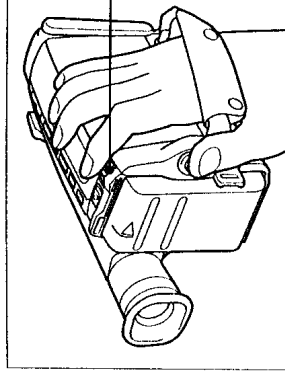
### Cuando se mueva del interior al exterior (o viceversa)

Gire STANDBY hacia arriba y apunte con la videocámara hacia un objeto blanco durante unos 15 segundos de forma que el equilibrio del blanco se ajuste apropiadamente.

## Using the Zoom Feature

Zooming is a recording technique that lets you change the size of the subject in the scene. For more professional-looking recordings, use the zoom sparingly.

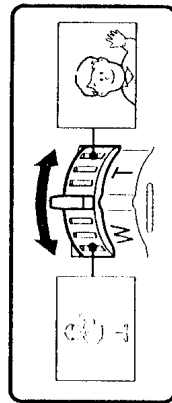
T side: for telephoto (subject appears closer)  
W side: for wide-angle (subject appears farther away)



## Empleo del zoom

El zoom es una técnica de videofilminación que le permite cambiar el tamaño del motivo en la escena. Para filmaciones de aspecto más profesional, utilice el zoom en forma limitada.

Lado T: para telefoto (el motivo se ve cercano)  
Lado W: para gran angular (el motivo se ve lejano)



The illustration may be different from the actual appearance.  
La ilustración puede diferir del aspecto actual.

## Zooming Speed

Turn the power zoom lever fully for a high-speed zoom. Turn it lightly for a relatively slow zoom.

## Notes on Digital Zoom (for CCD-TR510E only)

- You can select 12 x or 24 x of zooming.
- More than 12 x zoom is performed digitally, and the picture quality deteriorates as you go toward the T side. If you do not want to use the digital zoom set the ZOOM function to x12 (p. 36).
- The vertically bar in the power zoom indicator separates the digital zooming zone (right side of the bar [a]) and the optical zooming zone (left side of the bar [b]). If you slide the ZOOM switch to x12, the right side of the bar [a] disappears.



## When you shoot a subject using a telephoto zoom

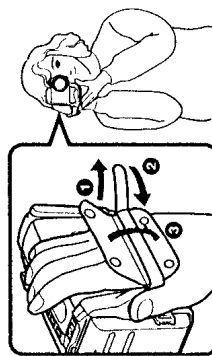
If you cannot get a sharp focus while in extreme telephoto zoom, turn the power zoom lever towards the W side until the focus is sharp.

You can shoot a subject that is at least 80 cm (about 2.6 feet) away from the lens surface in the telephoto position, or 1 cm (about 1/2 inches) in the wide-angle position.

## Hints for Better Shooting

For hand-held shots, you'll get better results holding the camcorder according to the following suggestions:

[a]



• Hold the camcorder firmly and secure it with the grip strap so that you can easily manipulate the controls with your thumb. [a]

• Place your right elbow against your side.

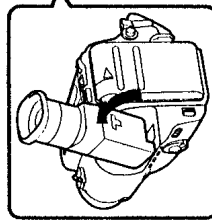
• Place your left hand under the camcorder to support it. Do not cover the microphone with your fingers.

• Place your eye firmly against the viewfinder eyecup.

• Use the viewfinder frame as a guide to determine the horizontal plane.

• You can also record in a low position to get an interesting recording angle. Turn the viewfinder up for recording from a low position. [b]

[b]



• Sujete la videocámara firmemente y asegúrela con la correa de la empuñadura de modo que pueda manipular fácilmente los controles con el pulgar. [a]

• Coloque su codo derecho firmemente contra su costado.

• Coloque su mano izquierda debajo de la videocámara para sostenerla. No cubra el micrófono con sus dedos.

• Apoye el ocular del visor de la videocámara firmemente contra su ojo.

• Para determinar el plano horizontal, utilice el cuadro del visor como referencia.

• Para obtener un ángulo de videofilminación interesante, usted también podrá grabar desde una posición baja. Para grabar desde una posición baja, gire el visor hacia arriba. [b]

## Consejos para videofilmar mejor

Para videofilmar con la videocámara en las manos, podrá obtener mejores imágenes sujetándola como se indica a continuación:

## Cuando videofilme un motivo empleando el acercamiento con el zoom

Si no puede enfocar nitidamente cuando videofilme con el zoom en el extremo del telefoto, gire la palanca del zoom motorizado hacia el lado W hasta enfocar nitidamente.

Usted podrá videofilmar un motivo que esté por lo menos a 80 cm de la superficie del objetivo en la posición de telefoto, y a 1 cm en la de gran angular.

## Checking the Recorded Picture

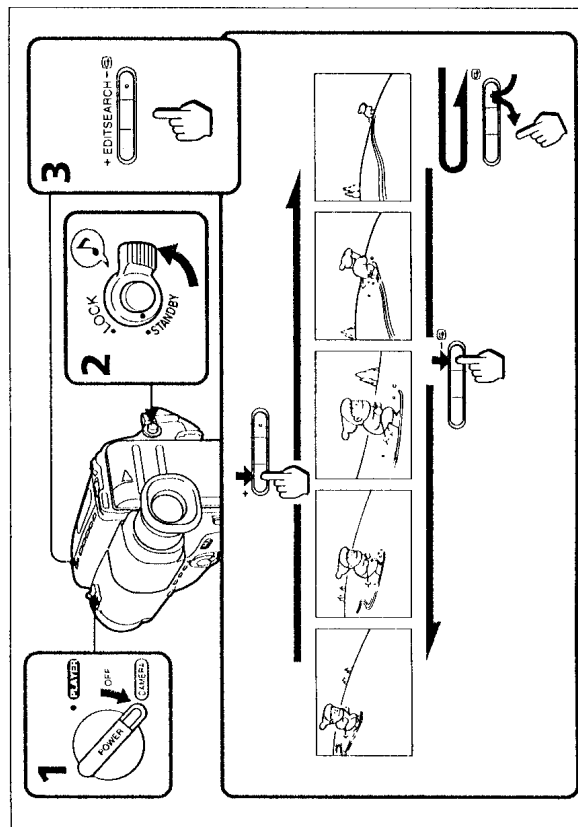
Using EDITSEARCH, you can review the last recorded scene or check the recorded picture in the viewfinder.

(1) While pressing the small green button on the POWER switch, turn it to CAMERA.

(2) Turn STANDBY up.

(3) Press EDITSEARCH. Press the  $\text{⏮}$  side momentarily, the last few seconds of the recorded portion plays back (Rec Review). Hold down the  $\text{⏮}$  side of EDITSEARCH until the camcorder goes back to the scene you want. The last recorded portion is played back. To go forward, hold down the  $\text{⏭}$  side (Editsearch).

Basic Operations Operaciones básicas



## Consejos para videofilmar mejor

Place the camcorder on a flat surface or use a tripod

Try placing the camcorder on a table top or any other flat surface of suitable height. If you have a tripod for a still camera, you can also use it with the camcorder (p. 62).

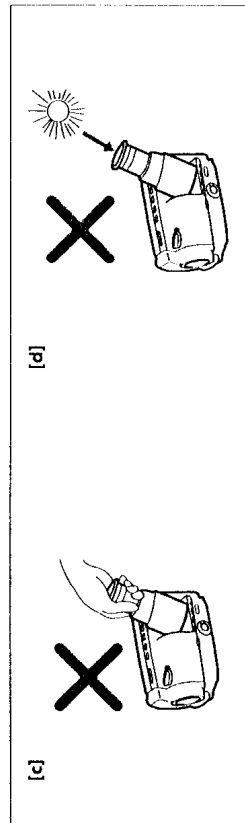
When attaching a non-Sony tripod, make sure the tripod screw is shorter than 6.5 mm (9/32 in). Otherwise, the screw may damage the inner parts of the camcorder.

### Cautions on the viewfinder

• Do not pick up the camcorder by the viewfinder.

[c]

• Do not place the camcorder so as to point the viewfinder toward the sun. The inside of the viewfinder may be deformed. Be careful in placing the camcorder under sunlight or by the window. [d]



Coloque la videocámara en una superficie plana o utilice un trípode

Pruebe colocando la videocámara sobre una mesa u otra superficie plana de altura adecuada. Si posee un trípode para cámara fotográfica, podrá emplearlo también con esta videocámara (pág. 62).

Cuando utilice un trípode que no sea Sony, asegúrese de que la longitud del tornillo del trípode sea inferior a 6,5 mm. De lo contrario, es posible que el tornillo dañe las partes internas de la videocámara.

### Precauciones sobre el visor

• No sujete la videocámara por el visor. [c]  
• No deje la videocámara con el visor apuntando hacia el sol. Es posible que el interior del visor se deforme. Tenga cuidado al dejar la videocámara bajo el sol o cerca de una ventana. [d]

## Verificación de las imágenes grabadas

Utilizando EDITSEARCH, usted podrá revisar la última escena grabada o comprobar la imagen grabada en el visor.

(1) Manteniendo presionado el pequeño botón verde en el selector POWER, gírelo hasta CAMERA.

(2) Gire STANDBY hacia arriba.

(3) Presione EDITSEARCH. Presione momentáneamente el lado  $\text{⏮}$  ( $\text{⏮}$ ). Se reproducirán los últimos segundos de la parte filmada (Revisión de la grabación). Mantenga presionado el lado  $\text{⏮}$  de EDITSEARCH hasta que la cinta retroceda hasta la escena deseada. La última parte filmada se reproducirá. Para avanzar la cinta, mantenga presionado el lado  $\text{⏭}$  (Búsqueda para la edición).

### To Begin Re-recording

Press START/STOP. Re-recording begins from the point you released EDITSEARCH. Provided you do not eject the cassette, the transition between the last scene you recorded and the next scene you record will be smooth.

### Para reanudar la grabación

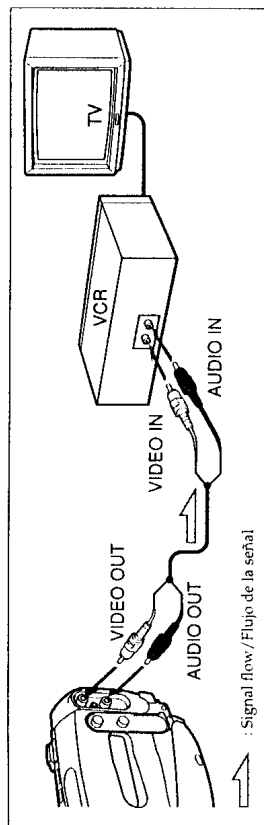
Presione START/STOP. La grabación se iniciará desde el punto en el que soltó EDITSEARCH. Mientras no extraiga el videocassette, la transición entre la última escena grabada y la siguiente será uniforme.



## Connections for Playback

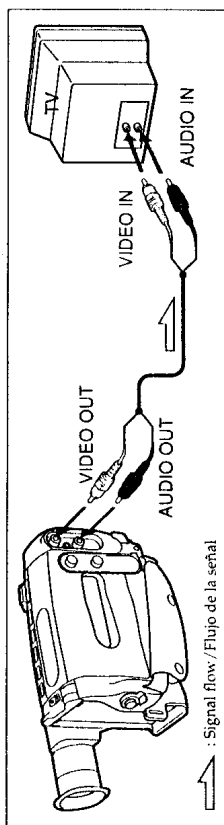
You can use this camcorder as a VCR by connecting it to your TV for playback. It is recommended to use the mains as the power source (p.25).

Connect the camcorder to LINE IN on the VCR by using the supplied A/V connecting cable. Set the input selector on the VCR to LINE. Set the TV/VCR selector to VCR on the TV.



### Connecting Directly to a TV

Connect the camcorder to your TV by using the supplied A/V connecting cable. Set the TV/VCR selector to VCR on the TV.



### Conexión directa a un televisor

Conecte la videocámara al televisor empleando el cable conector de audio/vídeo suministrado. Ponga el selector TV/VCR del televisor en VCR.

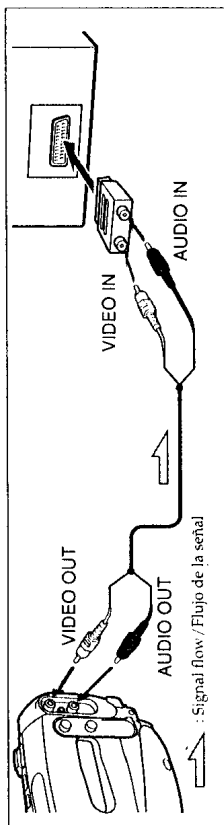
## Conexiones para la reproducción

Para la reproducción, usted podrá utilizar esta videocámara para que funcione como videograbadora conectándola a su televisor. Se recomienda utilizar la corriente de la red como fuente de alimentación (pág.25).

Conecte la videocámara a LINE IN de la videograbadora empleando el cable conector de audio/vídeo suministrado. Ponga el selector de entrada de la videograbadora en LINE, y el selector TV/VCR del televisor en VCR.

### If Your TV/VCR has a 21-pin Connector (EUROCONNECTOR)

Use the supplied 21-pin adaptor.



### To connect a TV or a VCR without Video/Audio input jacks

Use an RFU adaptor (not supplied).

Conexión a un televisor o una videograbadora sin tomas de entrada de vídeo/audio. Utilice un adaptador de RFU (no suministrado).

### If your TV/VCR has a 21-pin Connector (EUROCONNECTOR)

Use the supplied 21-pin adaptor.



## Reproducción de cintas

## Playing Back a Tape

You can monitor the playback picture in the viewfinder. You can also monitor on the TV screen, after connecting the camcorder to the TV/VCR (p. 20). You can control playback using the supplied Remote Commander\* (For CCD-TR420E/TR440E/TR510E only, p. 65).

\* For CCD-TR410E users:

The Remote Commanders are available on option.

- (1) While pressing the small green button on the POWER switch, turn it to PLAYER.
- (2) Insert the recorded tape with the window facing out.
- (3) Press **▶**. Playback starts.

♪: You can hear the beep sound to confirm your operation.

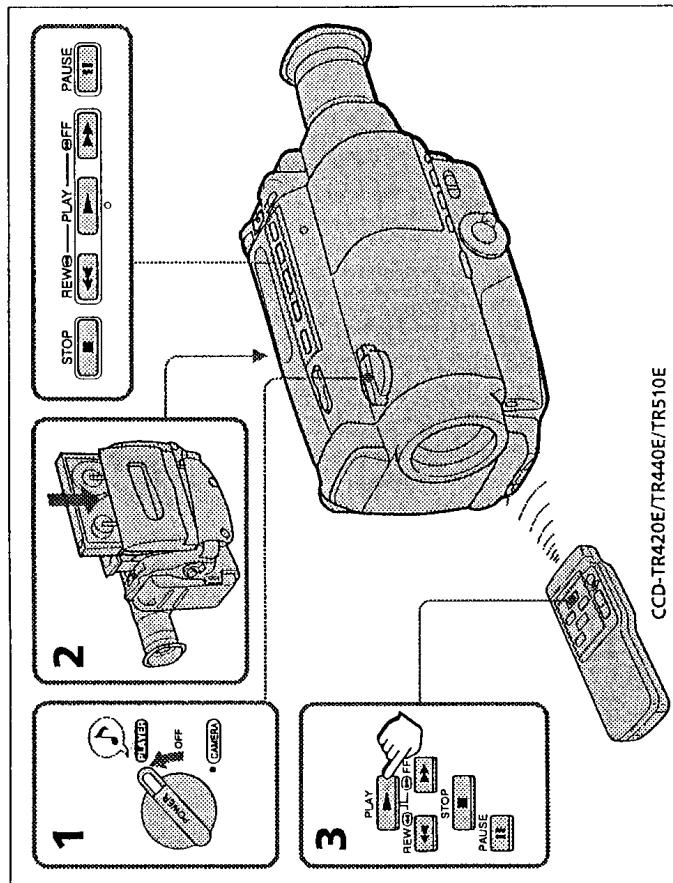
Usted podrá ver las imágenes reproducidas en el visor y también en la pantalla de televisor si conecta la videocámara a un televisor o una videograbadora (pág. 20). También podrá controlar la reproducción con el telemando suministrado\* (Para la CCD-TR420E/TR440E/TR510E solamente, pág. 65).

\* Para los usuarios de la CCD-TR410E:

Los telemandos están disponibles en opción.

- (1) Manteniendo presionado el pequeño botón verde en el selector POWER, gírelo hasta PLAYER.
- (2) Inserte una cinta grabada con la ventanilla hacia afuera.
- (3) Presione **▶**. Se iniciará la reproducción.

♪: Usted podrá oír un pitido para confirmar su operación.



To stop playback, press **■**.  
To rewind the tape, press **◀**.  
To fast-forward the tape, press **▶▶**.

Para cesar la reproducción, presione **■**.  
Para rebobinar la cinta, presione **◀◀**.  
Para hacer que la cinta avance rápidamente, presione **▶▶**.

## Diversos modos de reproducción

Para ver una imagen fija (reproducción en pausa)

Presione **II** durante la reproducción. Para reanudar la reproducción, presione **II** o **▶**.

## Para localizar una escena (búsqueda de imágenes)

Mantenga presionada **◀◀** o **▶▶** durante la reproducción. Para reanudar la reproducción normal, suelte la tecla.

## Para ver las imágenes a gran velocidad durante el avance rápido o el rebobinado (Exploración con salto)

Mantenga presionada **◀◀** durante el rebobinado o **▶▶** durante el avance de la cinta. Para reanudar la reproducción normal, presione **▶**.

## Para ver una secuencia de imágenes fijas

Presione EDITSEARCH en el modo de reproducción en pausa. Si la mantiene presionada, podrá ver las imágenes en el sentido progresivo (+) o regresivo (-).

## Notas sobre la reproducción

- En los diversos modos de reproducción aparecerán franjas y el sonido se silenciará.
- Cuando el modo de imagen fija dure 5 minutos o más, la videocámara pasará automáticamente al modo de parada.

## Various Playback Modes

To view a still picture (playback pause)

Press **II** during playback. To resume playback, press **II** or **▶**.

## To locate a scene (Picture Search)

Keep pressing **◀◀** or **▶▶** during playback. To resume normal playback, release the button.

## To monitor the high-speed picture during fastforward or rewind (Skip Scan)

Keep pressing **◀◀** while rewinding or **▶▶** while advancing the tape. To resume normal playback, press **▶**.

## To view the picture in a sequence of stop-motion images

Press EDITSEARCH in playback pause mode. If you keep pressing EDITSEARCH, you can view the picture playback in the forward (+) or reverse (-) direction.

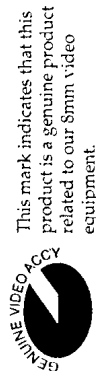
## Notes on playback

- Streaks appear and the sound is muted in the various playback modes.
- When still picture mode lasts for 5 minutes or more, the camcorder automatically enters stop mode.

## Using Alternate Power Sources

You can choose any of the following power sources for your camcorder: battery pack (P.7), the mains, and 12/24 V car battery. Choose the appropriate power source depending on where you want to use your camcorder.

Place	Power source	Accessory to be used
Indoors	House current	AC power adaptor AC-V15 (supplied), AC-S10
Outdoor	Battery pack	Battery pack NP-33 (supplied), NP-55H, NP-65/67, NP-66H/68, NP-77H/77HD, NP-90/90D, NP-98/98D
	LR6 (size AA) Sony Alkaline battery	Battery case (supplied)
In the car	12 V or 24 V car battery	DC pack DCP-77



This mark indicates that this product is a genuine product related to our 8mm video equipment.

When purchasing our 8mm video equipment, we recommend that you purchase related 8mm video products provided with the same mark or products provided with our logotype mark.

## Utilización de fuentes de alimentación alternativas

Con esta videocámara podrá elegir cualquiera de las siguientes fuentes de alimentación: batería (pág.7), corriente de la red, y batería de un automóvil de 12-24 V. Elija la fuente de alimentación apropiada de acuerdo con el lugar donde desee utilizar la videocámara.

Lugar	Fuente de alimentación	Accesorio necesario
Interiores	Corriente de la red	Adaptador de alimentación de CA AC-V15 (suministrado), AC-S10
Exteriores	Batería	Batería NP-33 (suministrada), NP-55H, NP-65/67, NP-66H/68, NP-77H/77HD, NP-90/90D, NP-98/98D
	Pilas alcalinas LR6 (tamaño AA) Sony	Caja de pilas (suministrada)
En un automóvil	Batería de 12 V o 24 V	Paquete de CC DCP-77



Esta marca indica que este producto es genuino y está relacionado con nuestro equipo de video de 8mm.

A la hora de adquirir nuestro equipo de video de 8mm, recomendamos elegir los productos de video relacionados de 8mm que dispongan de esta marca u otros con nuestro logotipo.

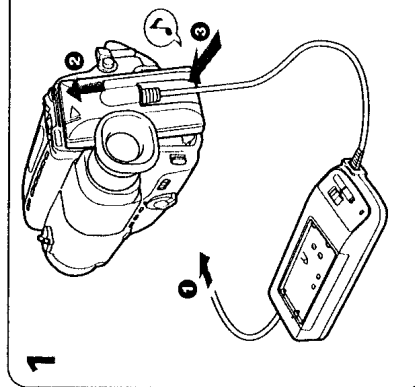
### Using the Mains

To use the supplied AC-V15 AC power adaptor:

- (1) Connect the mains lead to a wall outlet. Insert the top of the connecting plate of the AC power adaptor into the top of the battery mounting surface. Push the connecting plate so that it attaches firmly.

- (2) Set the selector to VTR (DC OUT).

You can hear the beep sound to confirm your operation.



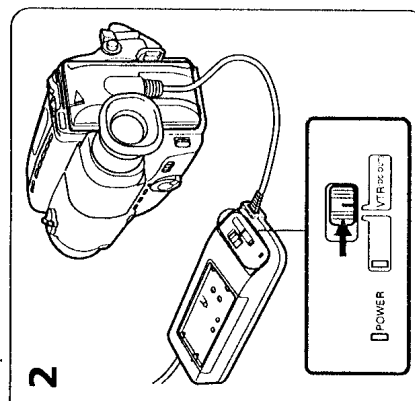
### Utilización con la corriente de la red

Para utilizar el adaptador de alimentación de CA AC-V15 suministrado:

- (1) Conecte el cable de alimentación a una toma de la red. Inserte la parte superior de la placa conectora del adaptador de alimentación de CA en la parte superior de la superficie de montaje de la batería de la videocámara. Empuje la placa de forma que ésta quede firmemente fijada.

- (2) Ponga el selector en VTR (DC OUT).

Usted podrá oír el pitido para confirmar la operación.



### WARNING

Mains lead must only be changed at qualified service shop.

### PRECAUTIONS

The set is not disconnected from the AC power source (mains) as long as it is connected to the wall outlet, even if the set itself has been turned off.

### Notes on the POWER lamp

- The POWER lamp will remain lit for a while even if the unit is unplugged after use. This is normal.
- If the POWER lamp does not light, set the selector to VTR (DC OUT) and disconnect the mains lead. After about one minute, try again.

### To remove the adaptor

The adaptor is removed in the same way as the battery pack. (p. 10)

### ADVERTENCIA

El cable de alimentación de la red deberá cambiarse solamente en una estación de servicios calificada.

### PRECAUCIÓN

Este aparato no se desconectará de la fuente de alimentación de CA (red) mientras esté enchufado en una toma de la misma, incluso aunque haya desconectado su alimentación.

### Notas sobre la lámpara POWER

- Es normal que esta lámpara permanezca encendida durante un momento aunque desenchufe la unidad después de utilizarla.
- Cuando la lámpara POWER no se enciende, ponga el selector en VTR (DC OUT) y desconecte el cable de alimentación. Aproximadamente un minuto después, trate otra vez.

### Para quitar el adaptador

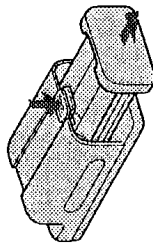
Quítelo igual que la batería (pág.10).

### Using the Battery Case

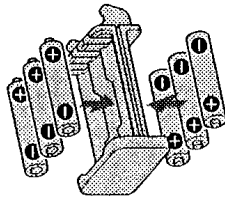
Use the battery case (supplied) and six LR6 (size AA) Sony alkaline batteries (not supplied).

- (1) Remove the battery holder from the battery case.
- (2) Insert six new alkaline batteries into the battery holder, following the marking on the holder to be sure the batteries are installed in the correct direction.
- (3) Insert the battery holder with the alkaline batteries.
- (4) Insert the battery case with the alkaline batteries to the battery mounting surface of the camcorder in the same way as the battery pack (p. 10).

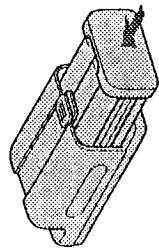
1



2



3



### Battery Life

Using Sony alkaline batteries

Model	Typical recording time	Continuous recording time
CCD-TR410E/TR420E	50 min.	90 min.
CCD-TR440E/TR510E	40 min.	75 min.

#### Note

The battery life may be shorter depending on the using environment.

### To remove the battery case

The battery case is removed in the same way as the battery pack (p. 10).  
When you replace the batteries, be sure to remove the battery case from the camcorder to prevent malfunction.

### Using a Car Battery

Use the DCP-77 DC pack (not supplied). Connect the cord of the DC pack to the cigarette lighter socket of a car (12 V or 24 V). Connect the DC pack to the battery mounting surface of the camcorder.

#### To remove the DC pack

The DC pack is removed in the same way as the battery pack (p. 10).

### Options for Charging the Battery Pack

AC-S10 AC power adaptor:

You can charge a battery pack whether it is used up or not with this adaptor because it has a discharging function.

### Utilización con la batería de un automóvil

Emplee un paquete de CC DCP-77 (no suministrado). Conecte el cable del paquete de CC a la toma del encendedor de cigarrillos de un automóvil (12 o 24 V). Conecte el paquete de CC a la superficie de montaje de la batería de la videocámara.

#### Para quitar el paquete de CC

Quítelo igual que la batería (pág.10).

### Opciones para cargar la batería

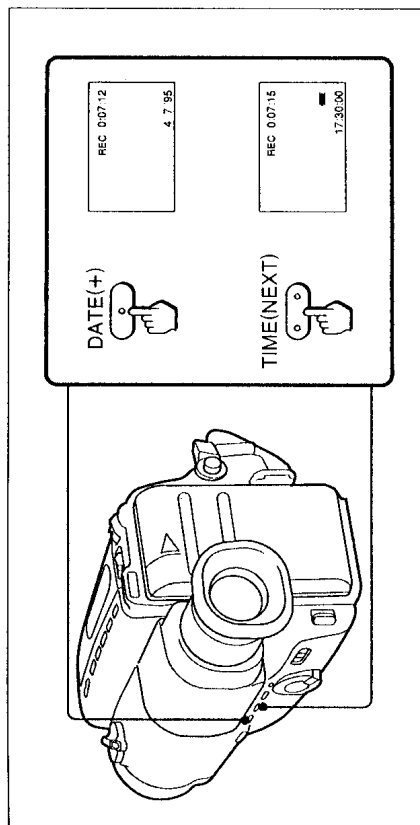
Adaptador de alimentación de CA AC-S10:

Como este adaptador posee función de descarga, usted podrá cargar la batería independientemente de que ésta se haya agotado o no.

## Recording with the Date or Time

Before you start recording, press DATE or TIME. You can record the date or time displayed in the viewfinder with the picture. You cannot record the date and time at the same time. Except for the date or time indicator, no indicator in the viewfinder is recorded.

The clock is set to London for the United Kingdom models and Paris for other European models at the factory.



### To Stop Recording with the Date or Time

Press DATE or TIME again. Recording continues.

## Grabación de la fecha o la hora

Antes de comenzar la videofilmación, presione DATE o TIME. Usted podrá grabar con las imágenes la fecha o la hora visualizada en el visor. La fecha y la hora no podrán grabarse al mismo tiempo. Además de los indicadores de la fecha y la hora, no se grabará ninguno de los demás indicadores del visor.


El reloj ha sido ajustado en fábrica a la hora de Londres para los modelos destinados al Reino Unido y a la de París para los demás modelos europeos.

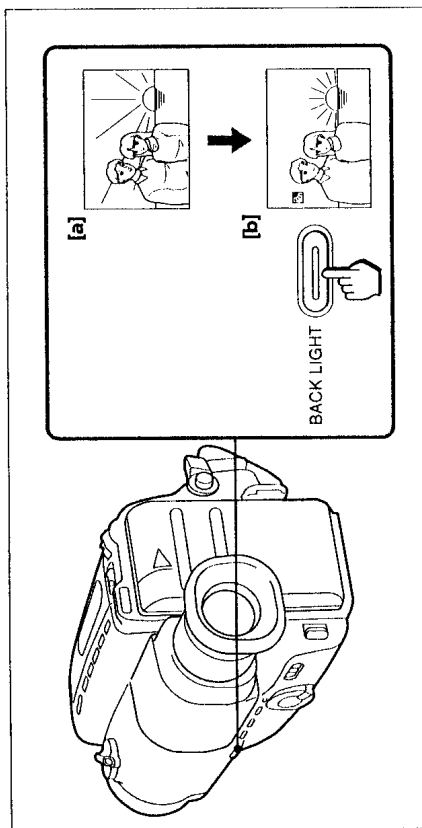
### Para cesar la grabación de la fecha o la hora

Vuelva a presionar DATE o TIME. La grabación de las imágenes continuará.

## Shooting with Backlighting


When you shoot a subject with the light source behind the subject or a subject with a light background, use the BACK LIGHT.

Press BACK LIGHT. The  indicator appears inside the viewfinder.



[a] Subject is too dark because of backlight.  
[b] Subject becomes bright with backlight compensation.

### After Shooting


Press BACK LIGHT again to let the  indicator go out under normal lighting condition. Otherwise, the picture will be too bright under normal lighting condition.

This function is also effective under following conditions:

- On the snow e.g. at the ski resort
- At the beach under strong sunshine
- A subject with a light source nearby or a mirror reflecting light
- A white subject against a white background. Especially when you shoot a person wearing shiny clothes made of silk or synthetic fiber, his or her face tends to become dark if you do not use this function.


## Videofilmación a contraluz

Cuando videofilme un motivo con la fuente de iluminación detrás de él o a contraluz, utilice BACK LIGHT.

Presione BACK LIGHT. En el visor aparecerá el indicador .

[a] El motivo está demasiado oscuro debido al contraluz.  
[b] El motivo se ve claro con la compensación del contraluz.

### Después de la videofilmación

Vuelva a presionar BACK LIGHT de forma que desaparezca el indicador  con la iluminación en la condición normal. De lo contrario, las imágenes se grabarán demasiado brillantes con la iluminación en condición normal.

Esta función también será efectiva en las siguientes condiciones:

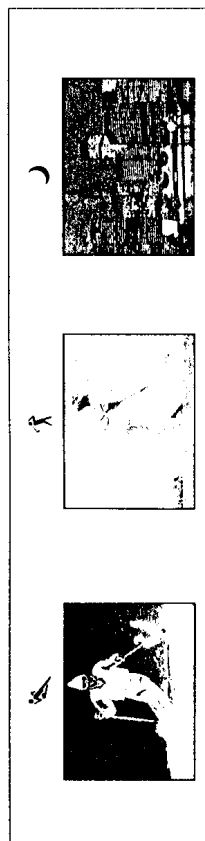
- Paisaje de nieve, por ej. en un campo de esquí.
- En una playa con luz solar fuerte.
- Un motivo con una fuente de iluminación cercana o un espejo que refleje luz.
- Un motivo blanco contra un fondo blanco. Especialmente cuando videofilme una persona vestida con ropa brillante como de seda o fibra sintética sin utilizar la función BACK LIGHT, el rostro tenderá a grabarse oscuro.

## Using the PROGRAM AE Function

You can select from three PROGRAM AE (Auto Exposure) modes to suit your shooting situation. When you use PROGRAM AE, you can capture high-speed action or night views.

### Selecting the Best Mode

Select the best mode by using the following examples.



#### Sports mode

- Outdoor sports scenes such as football, tennis, golf or skiing
- A landscape in a moving car

#### High-speed shutter mode

- A golf swing or a tennis match in fine weather with the ball captured clearly
- Playing back certain scenes with high-speed movements in clear, sharp picture

#### Twilight mode

- Recording night views, neon signs or fireworks

#### Modo de deportes

- Videofilación de escenas de deportes de exteriores como fútbol, tenis, golf o esquí
- Videofilación de paisajes desde un automóvil en marcha

#### Modo de obturación a alta velocidad

- Un swing de golf o un partido de tenis en un día claro con la pelota visualizada claramente
- Reproducir ciertas escenas con movimientos a gran velocidad en una imagen clara y nítida

#### Modo de crepúsculo

- Videofilación de vistas nocturnas, letreros de neón o fuegos artificiales.

## Empleo de la función PROGRAM AE

Usted podrá seleccionar entre tres modos de PROGRAM AE (exposición automática programada), de acuerdo con la condición de videofilación. Con la función de PROGRAM AE, podrá captar una acción a gran velocidad o grabar vistas nocturnas.

### Selección del modo apropiado

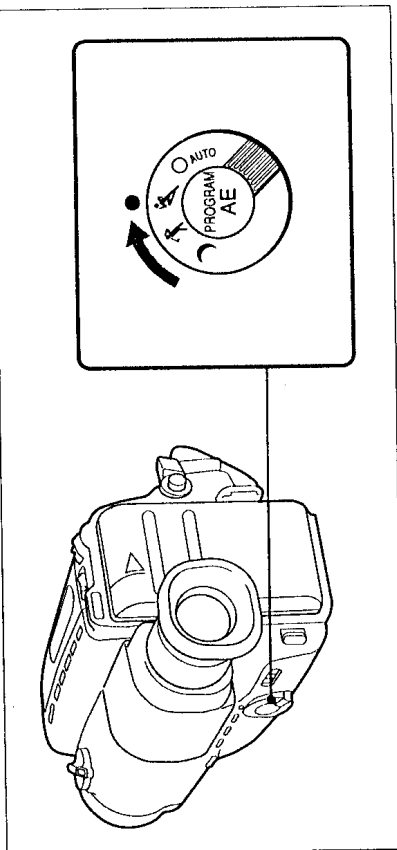
Seleccione el modo apropiado consultando los siguientes ejemplos.

### Using the PROGRAM AE Function

Set the mark of the desired mode to the ● mark above the PROGRAM AE dial.

### Empleo de la función PROGRAM AE

Ajuste la marca del modo deseado a la marca ● situada arriba del dial PROGRAM AE.



#### Note on shutter speed

The shutter speed in each PROGRAM AE mode is as follows:

- Sports mode - between 1/50 to 1/500
- High-speed shutter mode - 1/4000
- Twilight mode - 1/50
- AUTO mode - 1/50

#### Nota sobre la velocidad de obturación

La velocidad de obturación en cada modo PROGRAM AE es el siguiente:

- Modo de deportes - entre 1/50 y 1/500
- Modo de obturación a alta velocidad - 1/4000
- Modo de crepúsculo - 1/50
- Modo AUTO - 1/50

## Shooting Scenery in Several Short Takes

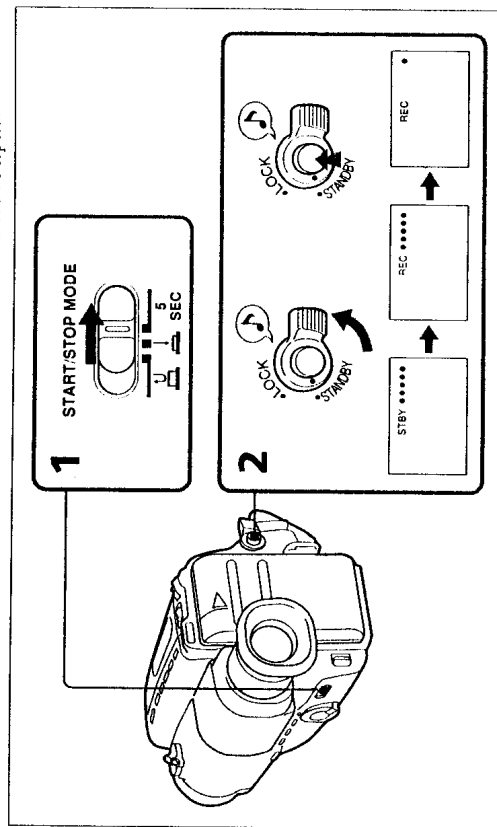
Long, continuous shots of scenery tend to be dull, and have to be edited to make an interesting video. With the 5 SEC (5-second recording) mode, the camcorder records for about 5 seconds and then switches to Standby mode, so that you will automatically take a series of quick shots resulting in a lively video.

- (1) Slide the START/STOP MODE switch to 5 SEC.
- (2) Turn STANDBY up and press START/STOP. Recording starts. Five dots appears in the viewfinder.  
The dots disappear at a rate of one per second. When five seconds elapse and all the dots disappear, the camcorder switches to Standby mode automatically.

## Videofilación de escenas en varias tomas cortas

Una toma larga y continua de una escena tiende a ser aburrida y tendrá que editarse para obtener un video interesante. Con el modo de videofilación de 5 segundos (5 SEC), la videocámara grabará durante unos 5 segundos y pasará al modo de espera. De esta manera, usted podrá tomar automáticamente una serie de planos rápidos resultando en un video vivo.

- (1) Deslice el selector START/STOP MODE hasta 5 SEC.
- (2) Gire STANDBY hacia arriba y presione START/STOP. La grabación comenzará. En el visor aparecerán cinco puntos. Los puntos desaparecerán a razón de uno por segundo. Después de 5 segundos, todos los puntos desaparecerán y la videocámara pasará automáticamente al modo de espera.



### To Extend the Recording Time

Press START/STOP again before all the dots disappear. Recording continues for about 5 seconds from the moment you press START/STOP.

### To Cancel 5-Second Recording

Slide the START/STOP MODE switch to (normal recording). If you slide the switch while recording, recording continues.

### Para prolongar el tiempo de videofilación

Vuelva a presionar START/STOP antes de que desaparezcan todos los puntos. La videofilación continuará durante unos 5 segundos desde el momento en que presione START/STOP.

### Para cancelar la videofilación de 5 segundos

Deslice el selector START/STOP MODE hasta (videofilación normal). Si desliza este selector durante la videofilación, ésta continuará.

## Superimposing a Title

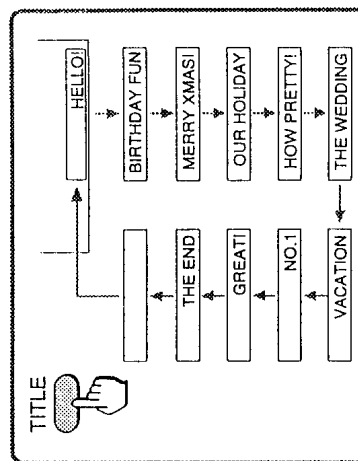
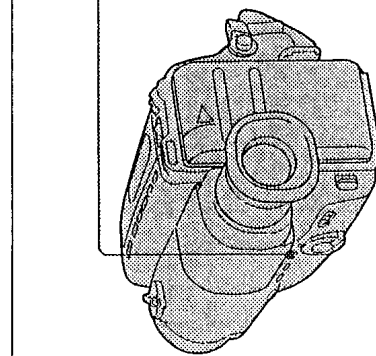
You can select from ten preset titles to superimpose it on the picture during recording. Each time you press TITLE, the preset titles appear one by one.

### To Superimpose from the Beginning

- (1) Turn the POWER switch to CAMERA.
- (2) Turn STANDBY up.
- (3) Press TITLE repeatedly until the desired title appears. The title flashes.
- (4) Press START/STOP to start recording.
- (5) Press TITLE when you want to turn off the title.

### To Superimpose On the Way of Recording

- (1) Press TITLE repeatedly until the desired title appears. The title flashes.
- (2) When the title stops flashing, press TITLE. The title disappears.
- (3) Press START/STOP to start recording.
- (4) Press TITLE when you want to superimpose the title.
- (5) Press TITLE when you want to turn off the title.



**Note on selecting a title**  
You cannot select a title during recording.

**Note sobre la selección del título**  
El título no podrá seleccionarse durante la grabación.

## Superposición de un título

Usted podrá seleccionar un título entre diez títulos memorizados y superponerlo sobre las imágenes durante la grabación. Cada vez que presione TITLE, los títulos memorizados aparecerán uno por uno.

### Para superponer desde el comienzo

- (1) Gire el selector POWER hasta CAMERA.
- (2) Gire STANDBY hacia arriba.
- (3) Presione repetidamente TITLE hasta que aparezca el título deseado. El título parpadeará.
- (4) Presione START/STOP para iniciar la videofilación.
- (5) Presione TITLE cuando desee que el título desaparezca.

### Para superponer en medio de la videofilación

- (1) Presione repetidamente TITLE hasta que aparezca el título deseado. El título parpadeará.
- (2) Cuando el título deje de parpadear, presione TITLE. El título desaparecerá.
- (3) Presione START/STOP para iniciar la videofilación.
- (4) Presione TITLE cuando desee superponer el título.
- (5) Vuelva a presionar TITLE cuando desee que el título desaparezca.

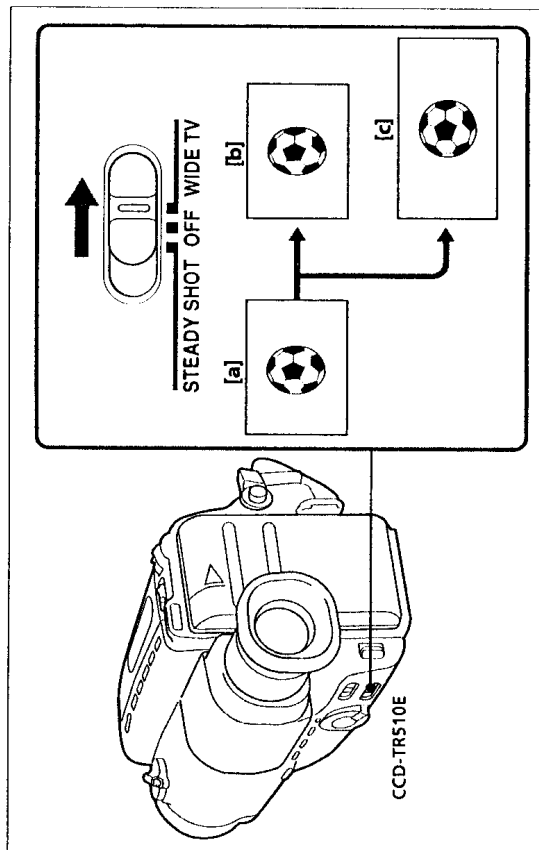
## Using the Wide Mode Function

— CCD-TR510E only

You can record a 16:9 wide picture to watch on the 16:9 wide-screen TV (WIDE TV).

### Using the Wide Mode Function

Slide STEADY SHOT/WIDE TV to WIDE TV. The picture in the viewfinder [a] or on a normal TV [b] is horizontally compressed. You can watch the picture of normal images on a wide-screen TV [c].



### To Release the Wide Mode

Slide STEADY SHOT/WIDE TV to OFF.

#### Notes on wide mode

- In WIDE TV mode, the STEADY SHOT does not work.
- When you record in WIDE TV mode, the date or time indicator will be widened on the wide-screen TV.
- If you dub a tape, the tape is copied in the same mode as the original recording.

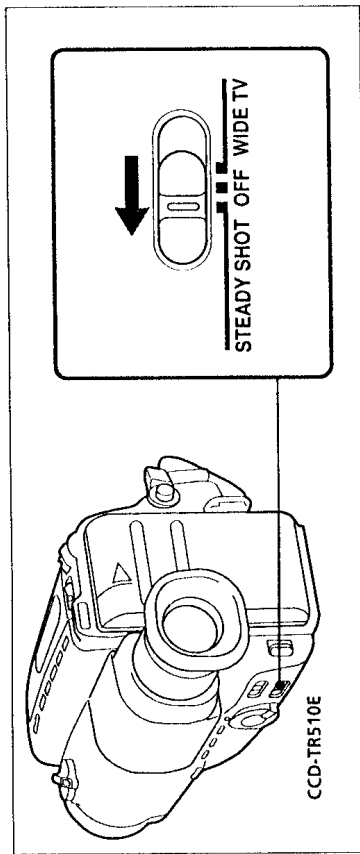
## Using the STEADY SHOT Function

— CCD-TR510E only

You can use the Steady Shot to compensate for camera-shake. Do not use the Steady Shot when shooting a stationary object with a tripod.

### Using the STEADY SHOT Function

Slide STEADY SHOT/WIDE TV to STEADY SHOT.



### To Release the Steady Shot

Slide STEADY SHOT/WIDE TV to OFF.

#### Note on the Steady Shot

- The Steady Shot will not correct excessive camera-shake.
- When you switch the Steady Shot on or off, the exposure may fluctuate.
- When you select WIDE TV mode, the Steady Shot does not work.

### Para desactivar la filmación estable

Deslice STEADY SHOT/WIDE TV hasta OFF.

#### Nota sobre la filmación estable

- La filmación estable no corregirá las sacudidas excesivas de la videocámara.
- Cuando active o desactive la filmación estable, es posible que la exposición fluctúe.
- Cuando seleccione el modo WIDE TV, la filmación estable no funcionará.

## Utilización de la función STEADY SHOT

— CCD-TR510E solamente

Usted podrá utilizar la función de filmación estable para compensar los sacudidos de la videocámara. No emplee esta función cuando videofilme un objeto estacionario con un trípode.

### Utilización de la función STEADY SHOT

Deslice STEADY SHOT/WIDE TV hasta STEADY SHOT.

### Para desactivar el modo panorámico

Deslice STEADY SHOT/WIDE TV hasta OFF.

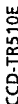
#### Notas sobre el modo panorámico

- En el modo WIDE TV, la función STEADY SHOT no funcionará.
- Cuando grabe en el modo WIDE TV, el indicador de la fecha o la hora se ensanchará en un televisor panorámico.
- Si duplica una cinta, ésta se copiará en el mismo modo que la grabación original.



# Cambio de los ajustes de modo

**(1)** Slide the cover to the left. You will find the mode switches.



### Selección de los ajustes de modo en cada ítem

**ZOOM <x24/x12> (CCD-TR510E solamente)**

- De lo contrario, ajústelo a  $\times 12$ . El zoom pasará a 12 aumentos.

COMMANDER<ON/OFF>

- videocámara (Para la CCD-TR420E/TR440E/  
TR510E solamente).

The Remote Commanders are available on option.

**BEEP<ON/OFF>**

- Seleccione **ON** para oír el pitido.
- Seleccione **OFF** si no desea oír el pitido.

REC MODE <SP/LP>

- Seleccione LP para grabar la cinta en el modo LP (duración larga).

37

**Edición en otra cinta**

or **B** Betamax VCR that has video/audio inputs.

**(2)** Insert a blank tape (or a tape you want to record over) into the recording VCR. Then

- simultaneously to start editing.

Repeat steps 3 to 5.

Press ■ STOP on the camcorder and VCR.

Repita los pasos 3 a 5.

**Para cesar la edición**

Presione ■ STOP de la videocámara y la videoregrabadora.

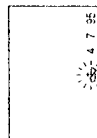
## Empleo de la tecla EDITSEARCH

Usted podrá reproducir una cinta en sentido progresivo o regresivo, manteniendo presionada la tecla **EDIT/SEARCH** durante la reproducción en pausa. Si la presiona en forma intermitente, podrá reproducir sucesivamente las imágenes fijas a ciertos intervalos.



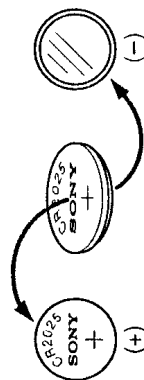
## Changing the Lithium Battery In the Camcorder

Your camcorder is supplied with the lithium battery installed. The lithium battery lasts for about 1 year under normal operation. When the battery becomes weak or dead, the indicator flashes in the viewfinder for about 5 seconds when you set the POWER switch to CAMERA. In this case, **replace the battery with the Sony CR2025 lithium battery. Use of another battery may present a risk of fire or explosion.**



### Note on Lithium Battery

Note that the lithium battery has a positive (+) and a negative (-) terminals as illustrated. **Be sure to install the lithium battery so that terminals on the battery match the terminals on the camcorder.**




### WARNING

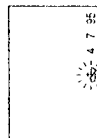
The battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

### Caution

Keep the lithium battery out of the reach of children. Should the battery be swallowed, consult a doctor immediately.

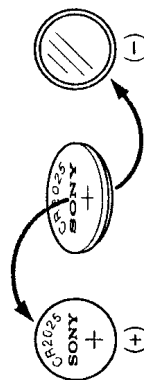
## Reemplazo de la pila de litio de la videocámara

En la videocámara se ha insertado en fábrica una pila de litio. La pila de litio durará aproximadamente 1 año si se utiliza en condiciones normales de funcionamiento. Cuando la pila de litio se debilita o agote, el indicador  parpadeará en el visor durante unos 5 segundos cuando ponga el selector POWER en CAMERA. En ese caso, **reemplace la pila por otra de litio CR2025 Sony. El empleo de otra pila puede suponer un riesgo de incendio o explosión.**



### Nota sobre la pila de litio

Tenga en cuenta que la pila de litio posee un terminal positivo (+) y otro negativo (-) como se ilustra. **Cerórese de colocar la pila de litio de forma que los terminales de la pila coincidan con los de la videocámara.**



### ADVERTENCIA

Si trata mal la pila, puede explotar. No recargue, desarme, ni tire la pila al fuego.

### Precaución

Mantenga la pila de litio fuera de alcance de los niños. Si alguien traga la pila, consulte inmediatamente a un médico.

## Changing the Lithium Battery

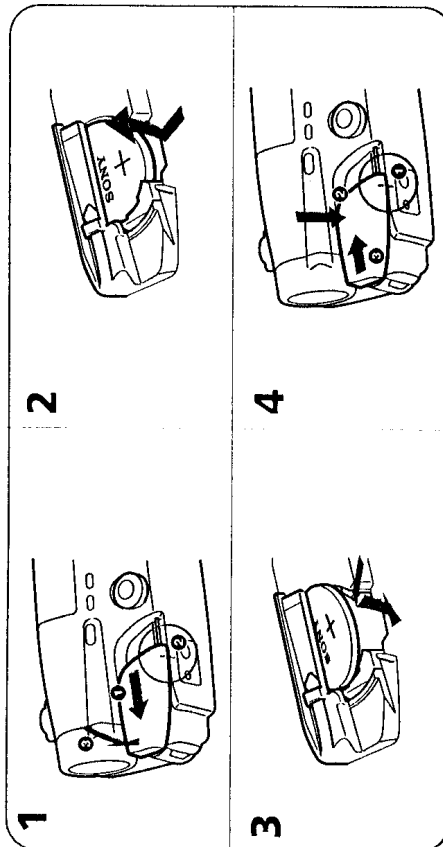
When replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, you will need to reset the date and time.

- (1) Slide the cover and align the mark of the cover to that of the body. Press down the cover.
- (2) Push the battery in once and pull it out from the holder.
- (3) Install the lithium battery with the positive (+) side facing out.
- (4) Align the mark of the cover to that of the body. Press the cover until it clicks and slide the cover.

## Reemplazo de la pila de litio

Durante el reemplazo de la pila de litio, mantenga la batería u otra fuente de alimentación conectada. De lo contrario, deberá reajustar la fecha y la hora.

- (1) Deslice la cubierta y alinee la marca de la cubierta con la marca del cuerpo. Presione la cubierta hacia abajo.
- (2) Empuje la pila una vez y extraícala de su compartimiento.
- (3) Coloque una pila de litio nueva con la cara positiva (+) hacia afuera.
- (4) Alinee la marca de la cubierta con la marca del cuerpo. Presione la cubierta hasta que chasquee y deslícela.

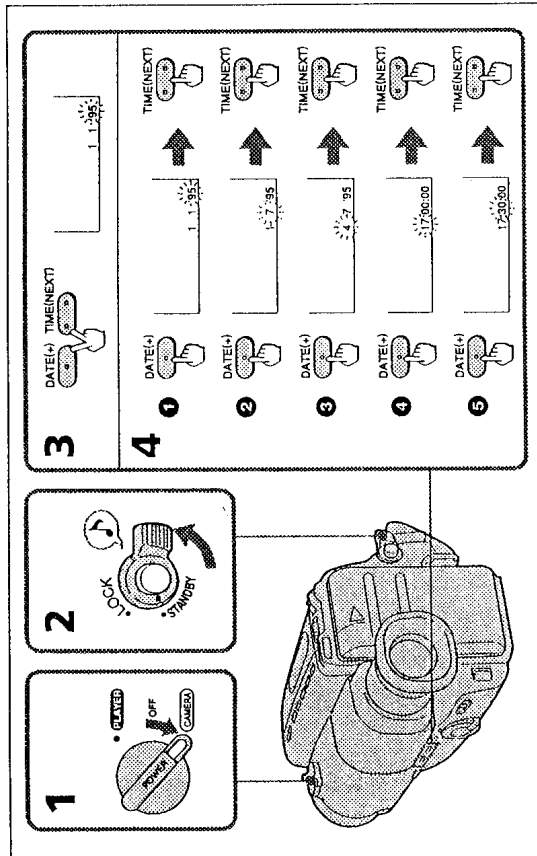


## Resetting the Date and Time

- Reset the date and time using the DATE(+) and TIME(NEXT) buttons.
- (1) Turn the POWER switch to CAMERA.
  - (2) Turn STANDBY up.
  - (3) Press DATE(+) and TIME(NEXT) simultaneously until the year indicator flashes in the viewfinder.
  - (4) Set year, month, day, time, minute by pressing DATE(+) and TIME(NEXT). Note that when you keep DATE(+) pressed, the digits advance faster.

## Reajuste de la fecha y la hora

- Reajuste la fecha y la hora utilizando las teclas DATE(+) y TIME(NEXT).
- (1) Gire el selector POWER hasta CAMERA.
  - (2) Gire STANDBY hacia arriba.
  - (2) Presione simultáneamente DATE(+) y TIME(NEXT) hasta que en el visor parpadee el indicador del año.
  - (3) Ajuste el año, mes, día, hora y minutos presionando DATE(+) y TIME(NEXT). Tenga en cuenta que si mantiene presionada DATE(+), los dígitos avanzarán con mayor rapidez.



**To Correct the Date and Time Setting**  
Repeat steps 3 and 4.

**To Check the Date and Time**  
Press DATE to display the date indicator in the viewfinder. Press TIME to display the time indicator. When you press the same button again, the indicator goes out.

The year indicator changes as follows:

'95 → '96 → '24

**Para corregir los ajustes de la fecha y la hora**  
Repita los pasos 3 a 4.

**Para comprobar la fecha y la hora**  
Presione DATE de forma que el indicador de la fecha aparezca en el visor. Presione TIME para visualizar el indicador de la hora. Cuando vuelva a presionar la misma tecla, el indicador se apagará.

El indicador del año cambiará como sigue:

'95 → '96 → '24

## Playback Modes

The playback mode is selected automatically according to the recording system (SP/LP mode) in which the tape was recorded.

### Foreign 8 mm video

You cannot play software recorded on a different TV colour system. Because the TV colour systems differ from country to country, you may not be able to play back foreign pre-recorded software. Refer to page 52 to check the TV colour system of foreign countries.

## Modos de reproducción

El modo de reproducción se seleccionará automáticamente de acuerdo con el sistema de grabación (modo SP/LP) en el que se haya grabado la cinta.

### Video cassette de 8 mm de otro sistema

Con esta videocámara no podrá reproducir un software grabado en un sistema de televisión en color diferente. Como el sistema de televisión en color difiere en cada país, es posible que no pueda reproducir un software previamente grabado. Con respecto al sistema de televisión en color de otros países, consulte la página 52.

## Tips for Using the Battery Pack

This section shows you how you can get the most out of your battery pack.

### Preparing the Battery Pack

#### Always Carry Additional Batteries

Have sufficient battery pack power to do 2 to 3 times as much recording as you have planned.

#### Battery Life is Shorter in Cold Environment

Battery efficiency is decreased and the battery will be used up more quickly if you are recording in cold environment.

#### To Save Battery Power

Turn the STANDBY switch on the camcorder down when not recording to save battery power. [a] on page 42.

A smooth transition between scenes can be made even if recording is stopped and started again. While positioning the subject, selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is used. The battery is also used when a cassette is inserted or removed.

## Consejos para utilizar la batería

En esta sección se explica la forma de obtener el máximo rendimiento de la batería.

### Preparación de la batería

#### Lleve siempre baterías adicionales

Prepare suficientes baterías como para poder alimentar la videocámara el doble o el triple del tiempo de filmación planeada.

#### La duración de la batería se acortará en climas fríos.

La eficacia de la batería disminuirá y se gastará con mayor rapidez si graba en climas fríos.

#### Para ahorrar batería

Gire el interruptor STANDBY de la videocámara hacia abajo cuando no vaya a videofilmar a fin de ahorrar batería. [a] de la página 42.

Aunque detenga y reinicie la filmación, obtendrá una grabación sin transiciones bruscas entre las escenas. Mientras encuadre el motivo o seleccione un ángulo, u observe a través del visor, el objetivo se moverá automáticamente y se utilizará la batería. La batería también se utilizará al insertar o extraer un videocassette.

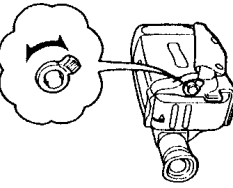
### When to Replace the Battery

While you are using your camcorder in CAMERA mode, the remaining battery indicator decreases gradually as battery power is used up.

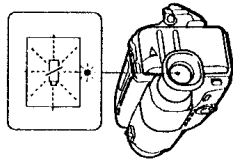


When the remaining battery indicator reaches the lowest point, the  $\square$  indicator appears and starts flashing in the viewfinder. [b]

When the  $\square$  indicator in the viewfinder changes from slow flashing to rapid flashing while you are recording, turn the POWER switch to OFF on the camcorder and replace the battery pack or alkaline batteries. Leave the tape in the camcorder to obtain smooth transition between scenes after the battery is replaced.



[a]



[b]

### Note on the remaining battery indicator

The remaining battery indicator of the camcorder may indicate a different remaining capacity from that of the battery pack with the remaining battery indicator (not supplied). The indicator of the battery pack is more accurate.

### Nota sobre el indicador de carga restante de la batería

Es posible que este indicador de la videocámara señale una capacidad restante diferente a la indicada por el indicador de la batería (no suministrada). El indicador de la batería es más preciso.

### Notes on the Rechargeable Battery Pack

#### The Battery Heats Up

During charging or recording, the battery pack heats up. This is caused by energy that has been generated and a chemical change that has occurred inside the battery pack. This is not cause for concern.

#### Battery Care

- Remove the battery pack from the camcorder after using the battery pack, and keep it in a cool place. When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder even if the POWER switch is set to OFF, which shortens battery life.
- The battery pack is always discharging, even when it is not in use after charging. Therefore, you should charge the battery right before using the camcorder.

### How to Use the Switch on the Battery Pack

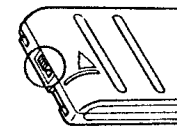
When the switch is supplied with the battery pack [c], you can use it to find whether the battery pack is charged or not. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up (or in whichever direction you want to remind yourself).

#### The Life of the Battery Pack

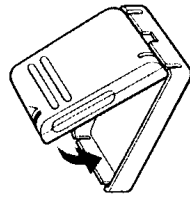
If the  $\square$  indicator flashes rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

#### Charging Temperature

You should charge batteries at temperatures from 10°C to 30°C (from 50°F to 86°F). Lower temperatures require a longer charging time.



[c]



[d]

### Notas sobre la batería

#### La batería se calentará

Durante la carga o la grabación, la batería se calentará. Esto se debe a la energía generada y al cambio químico que se produce en el interior de la batería, y no significa problema alguno.

#### Cuidado de la batería

- Después de haber empleado la batería quítela de la videocámara y guárdela en un lugar fresco. Mientras la batería esté fijada a la videocámara, circulará una pequeña cantidad de corriente incluso aunque el selector POWER esté en OFF. Esto acortará la duración útil de la batería.
- La batería estará siempre descargándose, incluso aunque no se utilice. Por lo tanto, se recomienda cargarla antes de emplear la videocámara.

#### Utilización del señalador de la batería

Si la batería posee un señalador [c], usted podrá utilizarlo para saber si la batería está cargada o no. Ponga el selector en la posición "sin marca" cuando finalice la carga.

Póngalo en la posición de la "marca roja" cuando la batería esté descargada completamente (o en el sentido que desee y pueda recordar usted mismo).

#### Vida útil de la batería

Si el indicador  $\square$  parpadea rápidamente después de haber conectado la alimentación de la videocámara con una batería completamente cargada, habrá que reemplazarla por otra nueva completamente cargada.

#### Temperatura durante la carga

Cargue la batería a una temperatura comprendida entre 10 y 30°C. A bajas temperaturas, la carga tardará más en realizarse.

### Notes on Charging

#### A Brand-new Battery

A brand-new battery pack is not charged. Before using the battery pack, charge it completely.

#### Before Recharging a Used Battery Pack

- Make sure to use up the battery before recharging.
- If recording is completed before the  $\odot$  indicator appears in the viewfinder, you should remove the tape, turn the POWER switch to CAMERA, turn STANDBY up, and leave the camcorder until the  $\odot$  indicator flashes rapidly.
- When you use the AC-S10 power adaptor, you can use the discharging function.
- **Charging the usable battery causes a lowering of battery capacity. Battery capacity can be recovered if you fully discharge and charge the battery again.**

#### After Long Storage

Recharge the battery pack after a long period of storage. If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged. Charge it again, but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

### Notes on the Terminals

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened. When the terminals are not clean or when the battery pack has not been used for a long time, repeat installing and removing the battery pack. This improves the contact condition. Also, wipe the + and - terminals with a soft cloth or paper.

#### Be Sure to Observe the Following

- To prevent an accident caused by a short circuit, do not allow metal objects such as a necklace to touch the battery terminals. Carry the battery pack attaching to the terminal cover. [d] on page 43.
- Keep the battery pack away from fire.
- Keep the battery pack dry.
- Do not open nor convert the battery pack.
- Do not expose the battery pack to any mechanical shock.

### Notas sobre la carga

#### Baterías nuevas

Una batería nueva no estará cargada. Antes de utilizarla, carguela completamente.

#### Antes de recargar baterías usadas

- Asegúrese de utilizar completamente la batería antes de cargarla.
- Si finaliza la filmación antes de que en el visor aparezca el indicador  $\odot$ , extraiga el videocassette, gire el selector POWER hasta CAMERA, gire STANDBY hacia arriba y deje la videocámara hasta que el indicador  $\odot$  parpadee rápidamente.
- Cuando utilice el adaptador de alimentación de CA AC-S10, podrá emplear la función de descarga.
- **Si carga una batería sin descargar hará que la capacidad de la misma disminuya. La capacidad de la batería podrá recuperarse si vuelve a descargar y cargarla completamente.**

#### Después de no haber utilizado una batería durante mucho tiempo

Recargue la batería después de no haberla utilizado durante mucho tiempo. Si una batería cargada completamente no se utiliza durante mucho tiempo (aproximadamente 1 año), ésta se descargará. Vuelva a cargar la batería, pero en este caso su duración será más corta de lo normal. Después de varios ciclos de carga y descarga, la batería recuperará su capacidad original.

### Notas sobre los terminales

Si los terminales (partes metálicas de la parte posterior) no están limpios, la duración de la batería se acortará. Cuando los terminales no estén limpios o no haya utilizado la batería durante mucho tiempo, fíje y quite la batería repetidamente. Esto mejorará el contacto. Además, frote los terminales + y - con un paño o un papel suave.

#### Tenga en cuenta lo siguiente

- Para prevenir accidentes debido a un cortocircuito, no deje que objetos metálicos como un collar entren en contacto con los terminales de la batería. Cuando lleve la batería, fíjela la cubierta de terminales. [d] a la página 43.
- Mantenga la batería alejada del fuego.
- No abra ni desarme la batería.
- No la someta a ninguna clase de golpes.

### Notes on the Battery Case

- Use only with alkaline batteries. You cannot use the battery case with manganese batteries or size AA rechargeable NiCd batteries.
- Using with Sony alkaline batteries is preferable.
- Battery life is remarkably shorter in a cold environment (lower than 10 °C/50 °F).
- Keep the metal part clean. If it gets dirty, wipe it with a soft cloth.
- Do not disassemble or convert the battery case.
- Do not expose the battery case to any mechanical shock.
- During recording, the battery case heats up. This is not cause for concern.
- Prevent the electrode in the battery case from coming in contact with a metal object.
- If you will not use the battery case for a long time, detach the battery case from the camcorder and remove the batteries from the battery case.

### Notes on Alkaline Batteries

To avoid possible damage from battery leakage or corrosion, observe the following.

- Be sure to insert the batteries in the correct direction.
- Alkaline batteries are not rechargeable.
- Do not use a combination of new and old batteries.
- Do not use different types of batteries.
- The batteries slowly discharge while not in use.
- Do not use a battery that is leaking.

#### If battery leakage occurred

- Wipe off the liquid in the battery case carefully before replacing the batteries.
- If you touch the liquid, wash it off with water.
- If the liquid get into your eyes, wash your eyes with a lot of water and then consult a doctor.

### Notas sobre la caja de pilas

- Utilícela solamente con pilas alcalinas. No podrá emplearla con pilas de manganeso ni baterías de NiCd de tamaño AA.
- Es aconsejable que la utilice con pilas alcalinas Sony.
- La duración de las pilas se acortará en climas fríos (inferiores a 10 °C).
- Mantenga limpia la parte metálica. Si se ensucia, frótlela con un paño suave.
- No desarme ni convierta la caja de pilas.
- No exponga la caja de pilas a ninguna clase de golpe.
- Durante la videofilación, la caja de pilas se calentará. Esto no es motivo de preocupación.
- Evite que el electrodo de la caja de pilas entre en contacto con un objeto metálico.
- Si no va a utilizar la caja de pilas durante mucho tiempo, quítela de la videocámara y extraiga las pilas de la misma.

### Notas sobre las pilas alcalinas

Para evitar el posible daño que podría causar el derrame del electrolito de las pilas o la corrosión, tenga en cuenta lo siguiente.

- Asegúrese de insertar las pilas en el sentido correcto.
- Las pilas alcalinas no pueden recargarse.
- No utilice una combinación de pilas nuevas y usadas.
- No emplee pilas de tipos diferentes.
- Las pilas se descargan lentamente cuando no se utilizan.
- No utilice una pila con derrame de su electrolito.



#### Si se produce un derrame del electrolito de las pilas

- Limpie cuidadosamente el líquido de la caja de pilas antes de reemplazar las pilas.
- Si tocara el líquido, lávese con agua.
- Si el líquido penetra en sus ojos, lave sus ojos con mucha agua y consulte a un médico.

## Moisture Condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape, or on the lens. If this happens, the tape may stick to the head drum and be damaged or the camcorder may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors. However, take the following precautions.



### Inside the Camcorder

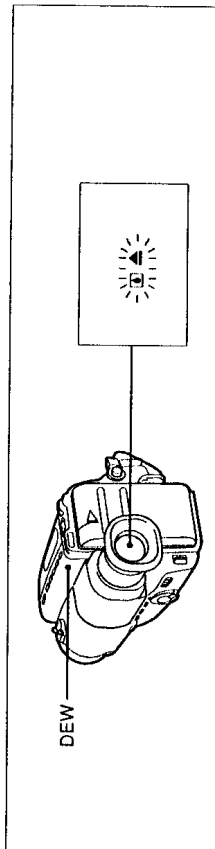
If there is moisture inside the camcorder, the beep sounds and  indicator or the DEW lamp flash. If this happens, none of the function except cassette ejection will work. Open the cassette compartment, turn off the camcorder, and leave it about 1 hour. When  indicator flashes at the same time, the cassette is inserted in the camcorder. Eject the cassette, turn off the camcorder, and leave also the cassette about 1 hour.

## Condensación de humedad

Si traslada directamente la videocámara de un lugar frío a otro cálido, es posible que se condense humedad en su interior, en la superficie de la cinta, o en el objetivo. En tales condiciones, la cinta puede adherirse al tambor de cabezas y estropearse, o la videocámara puede no funcionar adecuadamente. Para evitar la posibilidad de daños en estas circunstancias, la videocámara dispone de sensores de humedad. Sin embargo, tenga en cuenta las precauciones siguientes.

### En el interior de la videocámara

Si se condensa humedad en el interior de la videocámara, sonará un pitido y parpadeará el indicador  o la lámpara DEW. En tal caso, no trabajará ninguna función excepto la de expulsión del videocassette. Abra el compartimiento de la videocassette, desconecte la alimentación de la videocámara, y déjela durante aproximadamente 1 hora. Cuando el indicador  parpadee el mismo tiempo, habrá un videocassette insertado en la videocámara. Extraiga el videocassette, desconecte la alimentación de la videocámara, y deje también el videocassette durante aproximadamente 1 hora.



## On the Lens

No indicator will appear, but the picture becomes dim. Turn off the power and do not use the camcorder for about 1 hour.

## How to Prevent Moisture Condensation

When bringing the camcorder from a cold place to a warm place, put the camcorder in a plastic bag and allow it to adapt to room conditions over a period of time.

- (1) Be sure to tightly seal the plastic bag containing the camcorder.
- (2) Remove the bag when the air temperature inside it has reached the temperature surrounding it (after about 1 hour).

## En el objetivo

No aparecerá ningún indicador, pero la imagen se volverá borrosa. Desconecte la alimentación y no utilice la videocámara durante aproximadamente 1 hora.

## Cómo prevenir la condensación de humedad

Cuando traslade la videocámara de un lugar frío a otro cálido, coloque la videocámara en una bolsa de plástico y deje que se adapte a las condiciones ambientales de la habitación durante cierto tiempo.


- (1) No se olvide de cerrar firmemente la bolsa de plástico que contiene la videocámara.
- (2) Saque la videocámara de la bolsa cuando la temperatura del aire del interior de la bolsa haya alcanzado la ambiental (después de 1 hora aproximadamente).



## Maintenance Information and Precautions

## Información sobre el mantenimiento y precauciones

### Video Head Cleaning

To ensure clear pictures, clean the video heads. When  appears in the viewfinder in CAMERA mode or playback pictures are "noisy" or hardly visible, the video heads may be contaminated.



[a] Slight contamination

[b] Critical contamination

If this happens, clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied). After checking the picture, if it is still "noisy", repeat the cleaning. (Do not repeat cleaning more than 5 times.)


#### Caution

Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

#### Note

If the V8-25CLH cleaning cassette is not available in your area, consult your nearest Sony dealer.

### Limpieza de las cabezas de vídeo

Para asegurar imágenes claras, limpie las cabezas de vídeo. Cuando en el visor aparezca  en el modo CAMERA o las imágenes reproducidas sean "ruidosas" o difíciles de ver, es posible que las cabezas de vídeo estén contaminadas.



[a] Contaminación ligera

[b] Contaminación crítica

Cuando aparezcan estas imágenes, limpie las cabezas de vídeo con un cassette de limpieza V8-25CLH Sony (no suministrado). Después de la limpieza, si las imágenes siguen "ruidosas", repita la limpieza. (No repita la limpieza más de 5 veces.)

#### Precaución

No utilice cassettes de limpieza de tipo húmedo adquiribles en tiendas del ramo, ya que podrían dañar las cabezas de vídeo.

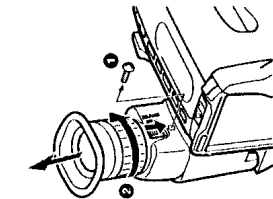
#### Nota

Si el cassette de limpieza V8-25CLH no está disponible en su zona, consulte a un centro de servicios Sony.

### Removing Dust from inside the Viewfinder

(1) Remove the screw with a screwdriver (not supplied). Then, while sliding the RELEASE knob, turn the eyecup in the direction of the arrow and pull it out.

(2) Clean the surface with a commercially available blower.

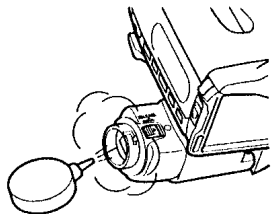


2

### Para quitar el polvo del interior del visor

(1) Quite el tornillo con un destornillador (no suministrado). Después, gire el ocular en el sentido de la flecha mientras mantenga deslizado el mando RELEASE y tire del ocular.

(2) Limpie la superficie con un soplador disponible en tiendas del ramo.

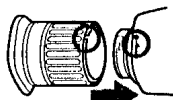


2

### To Reattach the Eyecup

(1) Align the groove on the eyecup with the mark on the barrel.

(2) Turn the eyecup in the direction of the arrow. Then, replace the screw.

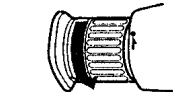


1

### Para volver a colocar el ocular

(1) Alinee la ranura del ocular con la marca • del tubo.

(2) Gire el ocular en el sentido de la flecha. Después vuelva a colocar el tornillo.



2



## Precautions

### Camcorder Operation

- Operate the camcorder using 6.0 V (battery pack), or 7.5 V (AC power adaptor).
- For DC or AC operation, use only the accessories recommended in this manual.
- Should any solid object or liquid fall into the casing, unplug the camcorder and have it checked by your nearest Sony dealer before operating it any further.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the POWER switch set to OFF when not using the camera.
- Do not wrap up the camcorder and operate it since heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.

### On Handling Tapes

Do not insert anything into the small holes on the rear of the cassette. These holes are used to sense the type, thickness of tape, or if the tab is out or in.

### Camcorder Care

- When the camcorder is not to be used for a long time, disconnect the power source and remove the cassette. Periodically turn on the power, operate the camera and player sections and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on the lens, remove them with a soft cloth.
- Clean the camcorder body with a soft dry cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

## Precauciones

### Operación de la videocámara

- Alimente la videocámara con 6,0 V (batería) o 7,5 V (adaptador de alimentación de CA).
- Para alimentarla con CC o CA, utilice sólo los accesorios recomendados en este manual.
- Si dentro de la videocámara cae algún objeto sólido o líquido, desenchufe la videocámara y haga que sea revisada por su proveedor Sony más cercano antes de reutilizarla.
- Evite tratos bruscos o golpes. Tenga especial cuidado con el objetivo.
- Cuando no vaya a utilizar la videocámara, ponga el selector POWER en OFF.
- No utilice la videocámara envuelta, porque se recalientaría.
- Mantenga la videocámara alejada de campos magnéticos intensos y vibraciones mecánicas.

### Cuidado del videocassette

No inserte nada en los pequeños orificios de la parte posterior del videocassette. Estos orificios se utilizan para detectar el tipo de cinta, su grosor, o si la lengüeta está o no deslizada.

### Cuidados de la videocámara

- Cuando no vaya a utilizar la videocámara durante mucho tiempo, desconecte la fuente de alimentación y extraiga el videocassette. Conecte periódicamente la alimentación, haga funcionar las secciones de la videocámara y el reproductor, y reproduzca una cinta durante unos 3 minutos.
- Limpie el polvo del objetivo con un cepillo suave. Elimine las huellas dactilares con un paño suave.
- Limpie el cuerpo de la videocámara con un paño suave y seco, o ligeramente humedecido en una solución muy diluida de detergente. No emplee ningún tipo de disolvente ya que podría dañar la terminación.

## AC Power Adaptor

### Charging

- Use only for the specified battery pack. This unit cannot be used to charge a lithium ion type battery.
- Attach the battery pack firmly.
- Charge the battery pack on a flat surface without vibration.

### Others

- Unplug the unit from the wall (mains) outlet when not in use for a long time. To disconnect the cord (mains lead) pull it out by the plug. Never pull the cord itself.
- Do not operate the unit with a damaged cord or if the unit has been dropped or damaged.
- Do not bend the AC power cord (mains lead) forcibly, or put a heavy object on it. This will damage the cord and may cause a fire or an electrical shock.
- Be sure that nothing metallic comes into contact with the metal parts of the connecting plate. If this happens, a short may occur and the unit may be damaged.
- Always keep the metal contacts clean.
- Do not disassemble the unit.
- Do not apply mechanical shock or drop the unit.
- While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment because it will disturb AM reception and video operation.
- The unit becomes warm while in use. This is normal.
- Do not place the unit in locations that are:
  - Extremely hot or cold
  - Dusty or dirty
  - Very humid
  - Vibrating

The warranty that comes with your camcorder does not cover replacement or repair of parts or damage due to use of Ni-MH batteries.

If any difficulty should arise, unplug the unit and contact your nearest Sony dealer.

## Adaptador de alimentación de CA

### Carga

- Empleéelo solamente para cargar la batería especificada. Este adaptador no podrá emplearse para cargar una batería de tipo iones de litio.
- Fije firmemente la batería.
- Cargue la batería sobre una superficie plana sin vibraciones.

### Otros

- Cuando no vaya a utilizar la unidad durante mucho tiempo, desenchufela de la toma de la red. Para desconectar el cable de alimentación (de la red), tire del enchufe. No tire nunca del propio cable.
- No emplee la unidad con el cable dañado, después de haberla dejado caer, o cuando esté dañada.
- No doble a la fuerza el cable de alimentación de CA (red), ni coloque objetos pesados sobre él, ya que podría dañar el cable y provocar incendios o descargas eléctricas.
- Cerciórese de que ningún objeto metálico entre en contacto con las partes metálicas de la placa conectora, ya que se podría producir un cortocircuito que dañaría la unidad.
- Mantenga siempre limpios los contactos metálicos.
- No desarme la unidad.
- No golpee ni deje caer la unidad.
- Cuando esté empleando la unidad, especialmente durante la carga, manténgala alejada de receptores de AM y equipos de vídeo porque perturbaría la recepción de AM y la operación de vídeo.
- La unidad se calentará durante el empleo. Pero esto es normal.
- No coloque la unidad en lugares:
  - Extremadamente cálidos o fríos
  - Polvorientos o sucios
  - Muy húmedos
  - Sujetos a vibraciones

La garantía que se suministra con la videocámara no cubre el reemplazo ni las reparaciones de partes o los daños debido al uso de baterías de Ni-MH.

Si surge alguna dificultad, desenchufe la unidad y póngase en contacto con su proveedor Sony.



## Using Your Camcorder Abroad

Each country has its own electricity and TV colour systems. Before using your camcorder abroad, check the following points:

### Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 110 V to 240 V AC, 50/60 Hz.

## Utilización de la videocámara en el extranjero

Cada país posee su propio sistema de suministro eléctrico y sistema de televisión en color. Antes de utilizar su videocámara en el extranjero, verifique los puntos siguientes:

### Fuentes de alimentación

Usted podrá utilizar su videocámara con el adaptador de alimentación de CA suministrado en cualquier país donde la tensión de la red sea de 110 a 240 V CA, 50/60 Hz.

### Difference in Colour Systems

This camcorder is a PAL system-based camcorder. If you want to view the playback picture on a TV, it must be a PAL system based TV or a SECAM system-based TV with PAL-SECAM transcoder. Check the following alphabetical list.

#### PAL system countries

Australia, Austria, Belgium, China, Denmark, Finland, Germany, Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

#### PAL M system country

Brazil

#### PAL N system countries

Argentina, Paraguay, Uruguay

#### NTSC system countries

Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

#### SECAM system countries

Bulgaria, Czech Republic, France, Guyana, Hungary, Iran, Iraq, Monaco, Poland, Russia, Slovak Republic, Ukraine, etc.

### Diferencia en los sistemas de color

Esta videocámara está basada en el sistema PAL. Si desea ver la imagen reproducida en un televisor, éste deberá estar basado en el sistema PAL o el sistema SECAM con transcodificador PAL-SECAM. Compruebe la lista siguiente en orden alfabético.

#### Países con el sistema PAL

Alemania, Australia, Austria, Bélgica, China, Dinamarca, España, Finlandia, Gran Bretaña, Holanda, Hong Kong, Italia, Kuwait, Malasia, Noruega, Nueva Zelanda, Portugal, Singapur, Suecia, Suiza, Tailandia, etc.

#### País con el sistema PAL M

Brasil

#### Países con el sistema PAL N

Argentina, Paraguay, Uruguay

#### Países con el sistema NTSC

Bolivia, Canadá, Centroamérica, Colombia, Corea, Chile, Ecuador, EE.UU., Filipinas, Islas Bahamas, Jamaica, Japón, México, Perú, Surinam, Taiwán, Venezuela, etc.

#### Países con el sistema SECAM

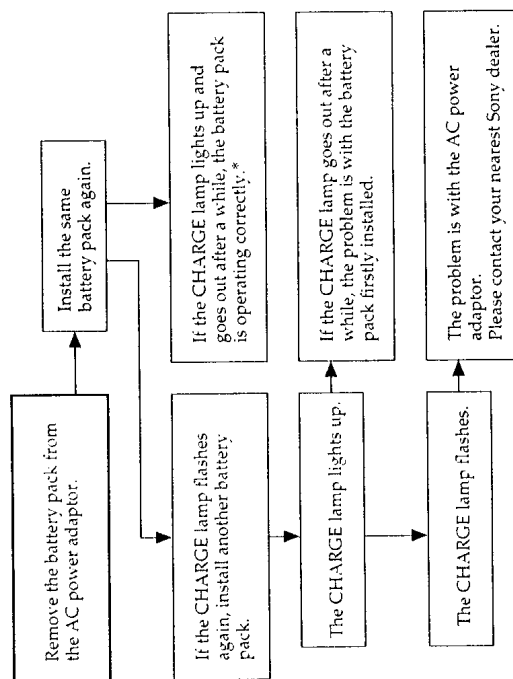
Bulgaria, Francia, Guayana, Hungría, Irán, Iraq, Mónaco, Polonia, República de Checo, República de Eslovaquia, Rusia, Ucrania, etc.

### AC Power Adaptor

Symptom	Cause	Corrective Actions	page
The POWER lamp does not light.	—	Set the selector to VTR (DC OUT) and disconnect the mains lead. After about one minute, try again.	9
The CHARGE lamp flashes.	See the following chart.		

### When the CHARGE Lamp Flashes

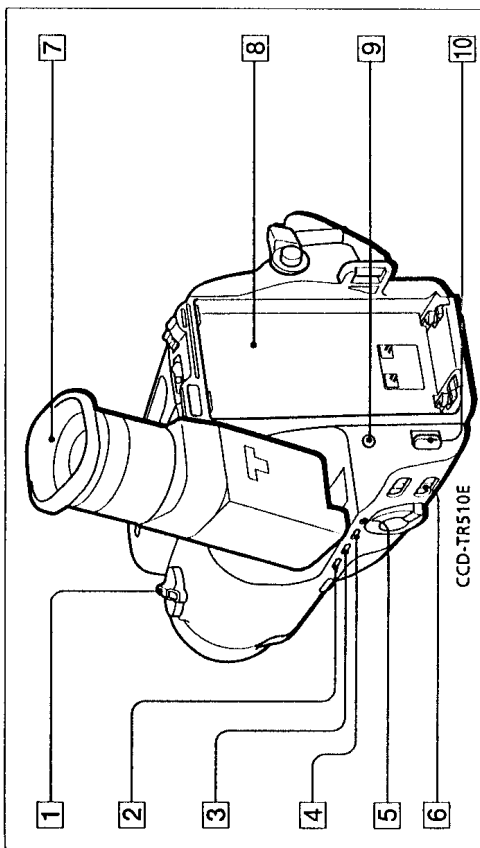
Check through the following chart.











\* If you use a battery pack which you have just bought or which has been left unused for a long time, the CHARGE lamp may flash at the first charging. But this is not a problem. Repeat again to charge with the same battery pack.

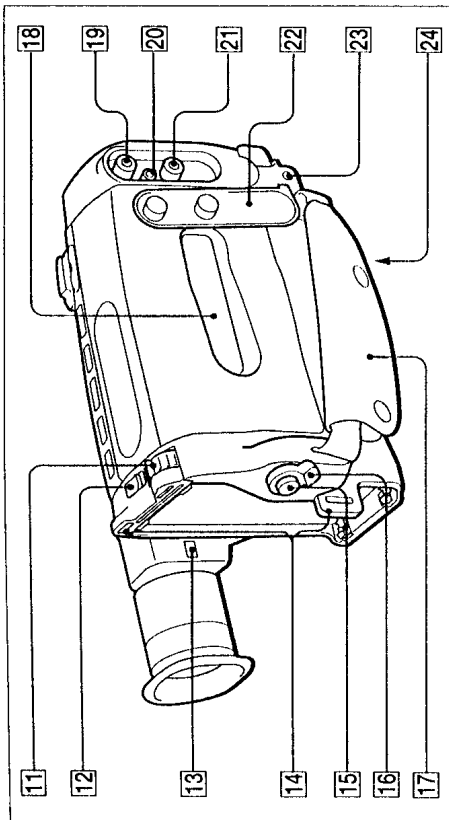
## Identifying the Parts

## Identificación de las partes



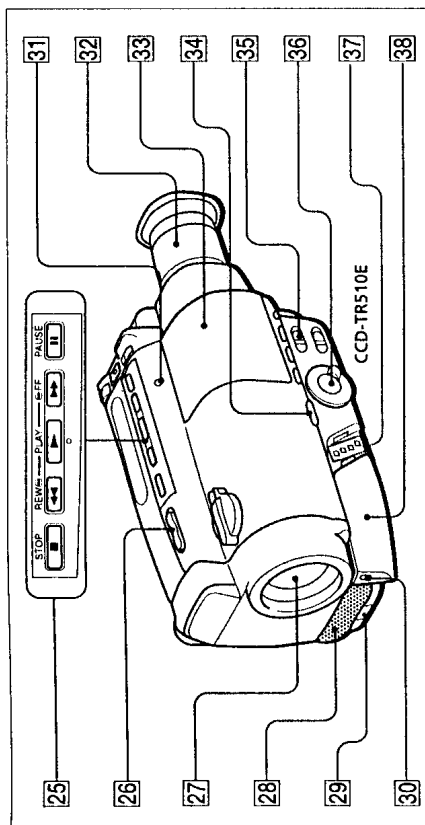
- 1 POWER switch (p.12, 22)
- 2 DATE(+) button (p.28, 40)
- 3 TIME(NEXT) button (p.28, 40)
- 4 TITLE button (p.33)
- 5 COUNTER RESET button (p.14)
- 6 STEADY SHOT/WIDE TV mode switch (p. 33, 34, 35)  
For CCD-TR510E only
- 7 Eyecup (p.17, 49)
- 8 Battery mounting surface (p.10)
- 9 LANC  control jack  
Connect the LANC  connecting cable to a wired remote control unit such as an editing controller. In this case, set the COMMANDER mode to OFF (p. 36).  stands for Local Application Control Bus system. The  control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the connectors indicated as CONTROL L or REMOTE.
- 10 BATT (battery) release knob (p.10)
- 1 Selector de alimentación (POWER) (pág.12, 22)
- 2 Tecla de ajuste de la fecha [DATE(+)] (pág.28, 40)
- 3 Tecla de ajuste de la hora [TIME(NEXT)] (pág.28, 40)
- 4 Tecla del título (TITLE) (pág.33)
- 5 Tecla de puesta a cero del contador (COUNTER RESET) (pág.14)
- 6 Conmutador de modo de filmación estable/televisor panorámico (STEADY SHOT/WIDE TV) (pág.34, 35)  
Para la CCD-TR510E solamente
- 7 Ocular (pág.17, 49)
- 8 Superficie de montaje de la batería (pág.10)
- 9 Toma de control remoto (LANC )  
Conecte un cable conector LANC  a una unidad de control remoto alámbrico como un controlador de edición. En este caso, ajuste el modo de COMMANDER a OFF (pág. 36).  significa sistema de control de bus de aplicación local. La toma  se emplea para controlar el movimiento de la cinta de equipos de vídeo y dispositivos periféricos conectados a la misma. Esta toma posee la misma función que los conectores indicados como CONTROL L o REMOTE.
- 10 Mando de expulsión de la batería (BATT) (pág.10)

## Identifying the Parts



- 11 Power zoom lever (p.16)
- 12 EJECT knob (p.11)
- 13 Eyecup release knob (p.49)
- 14 Hooks for shoulder strap (p.64)
- 15 START/STOP button (p.12, 13)
- 16 STANDBY switch (p.12, 13)
- 17 Grip strap (p.17)
- 18 Cassette compartment (p.11)
- 19 VIDEO OUT jack (p.20)
- 20 RFU DC OUT (RFU adaptor DC out) jack
- 21 AUDIO OUT jack (p.20)
- 22 Jack cover
- 23 MIC (microphone) jack  
Connect an optional external microphone.  
This jack also accepts a "plug-in-power" microphone.
- 24 Tripod receptacle (p.18)  
Attach a tripod (not supplied) here.  
When attaching a non-Sony tripod, make sure that the length of the camera mounting screw is shorter than 6.5 mm (9/32 inches).  
Otherwise, the screw might damage the inner part of the camcorder.

## Identificación de las partes



- 25 Tape transport buttons (p.22, 23)  
■ STOP  
■ STOP (parada)  
◀◀ REW (rewind)  
▶▶ PLAY (playback)  
▶▶ FF (fast forward)  
|| PAUSE  
These buttons will function in PLAYER mode.
- 26 EDITSEARCH button (p.19)
- 27 Lens cover
- 28 Built-in microphone
- 29 Remote sensor (p.67)
- 30 Camera recording/battery lamp
- 31 DEW lamp (p.46)
- 32 Viewfinder adjustment ring (p.13)
- 33 Viewfinder (p.13, 49, 69)
- 34 BACK LIGHT button (p.29)
- 35 START/STOP MODE switch (p.14, 32)
- 36 PROGRAM AE dial (p.31)
- 37 Mode switches (p.36)
- 38 Lithium battery compartment (p.39)
- 25 Teclas de transporte de la cinta (pág.22, 23)  
■ STOP (parada)  
◀◀ REW (rebobinado)  
▶▶ PLAY (reproducción)  
▶▶ FF (avance rápido)  
|| PAUSE (pausa)  
Estas teclas funcionarán en el modo PLAYER.
- 26 Tecla de búsqueda para edición (EDITSEARCH) (pág.19)
- 27 Cubierta del objetivo
- 28 Micrófono incorporado
- 29 Sensor remoto (pág.67)
- 30 Lámpara indicadora de videofilmación/estado de la batería
- 31 Lámpara de humedad (DEW) (pág.46)
- 32 Anillo de ajuste de la lente del visor (pág.13)
- 33 Visor (pág.13, 49, 69)
- 34 Tecla de videofilmación a contraluz (BACK LIGHT) (pág.29)
- 35 Selector de modo de inicio/parada de la videofilmación (START/STOP MODE) (pág.14, 32)
- 36 Dial de exposición automática programada (PROGRAM AE) (pág.31)
- 37 Selectores de modo (pág.36)
- 38 Compartimiento de la pila de litio (pág.39)

## Identifying the Parts

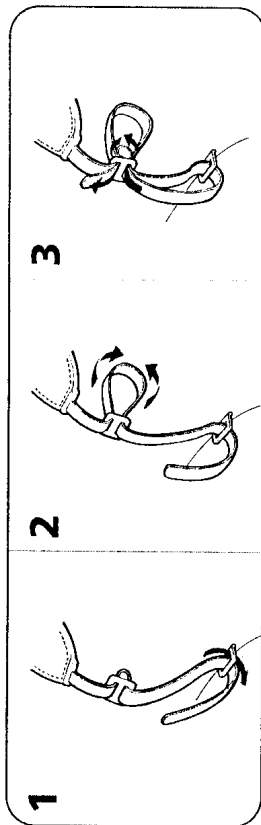
## Identificación de las partes

### Attaching the shoulder strap

Attach the supplied shoulder strap to the hooks for the shoulder strap (12) on page 62).

### Fijación de la bandolera

Fije la bandolera suministrada a los ganchos para la misma (12 de la página 62).

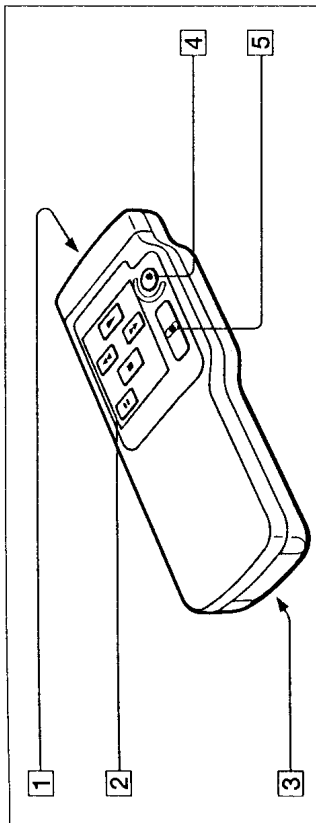


### Remote Commander

— For CCD-TR420E/TR440E/TR510E only  
The buttons that have the same name on the Remote Commander and on the camcorder function identically.

### Telemando

— Para la CCD-TR420E/TR440E/TR510E solamente  
Las teclas del telemando con el mismo nombre que las de la videocámara poseen idéntica función.



#### 1 Transmitter

Point toward the remote sensor to control the camcorder after turning on the POWER switch on the camcorder.

#### 1 Transmisor

Para controlar la videocámara con el telemando, gire el selector POWER de la videocámara y apunte este transmisor hacia el sensor remoto.

#### 2 Tape transport buttons (p.22, 23)

#### 2 Teclas de transporte de la cinta (pág.22, 23)

#### 3 R6 (size AA) battery holder (p.66)

#### 3 Compartimiento de las pilas R6 (tamaño AA) (pág.66)

#### 4 START/STOP button

#### 4 Tecla de inicio/parada (START/STOP)

#### 5 Power zoom button

The zooming speed is unchangeable on the Remote Commander.

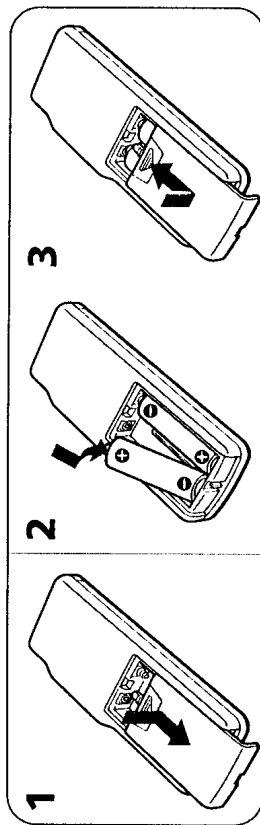
#### 5 Tecla del zoom motorizado La velocidad del zoom no podrá cambiarse en el telemando.

## Identifying the Parts

### Preparing the Remote Commander

To use the Remote Commander, you must insert two R6 (size AA) batteries. Use the supplied R6 (size AA) batteries.

- (1) Remove the battery cover from the Remote Commander.
- (2) Insert both of the R6 (size AA) batteries with correct polarity.
- (3) Put the battery cover back onto the Remote Commander.



### Note on battery life

The batteries for the Remote Commander last about 6 months under normal operation. When the batteries become weak or dead, the Remote Commander does not work.

### To avoid damage from possible battery leakage

Remove the batteries when you will not use the Remote Commander for a long time.

### Using the Remote Commander

Make sure that the COMMANDER mode is set to ON (p. 36).

### Nota sobre la duración de las pilas

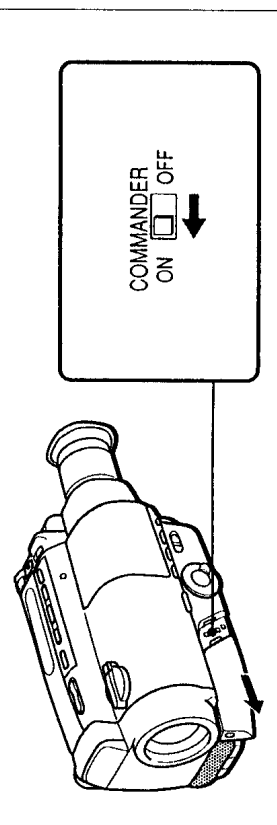
Las pilas en el telemando durarán unos 6 meses en condiciones normales de funcionamiento. Cuando las pilas se debiliten o agoten, el telemando no funcionará.

### Para evitar el daño que podría causar el derrame del electrolito de las pilas

Cuando no vaya a utilizar el telemando durante mucho tiempo, extraiga las pilas.

### Para emplear el telemando

Cerchiórese de ajustar el modo COMMANDER a ON (pág. 36).



## Identificación de las partes

### Preparación del telemando

Para utilizar el telemando, deberá colocar dos pilas R6 (tamaño AA). Utilice las pilas R6 (tamaño AA) suministradas.

- (1) Quite la tapa del compartimiento de las pilas en el telemando.
- (2) Inserte las dos pilas R6 (tamaño AA) con la polaridad correcta.
- (3) Cierre la tapa.



### Notes on the Remote Commander

- Keep the remote sensor away from strong light sources such as direct sunlight or illumination. Otherwise, the remote control may not be effective.

- Be sure that there is no obstacle between the remote sensor and the Remote Commander.

- This camcorder works at commander mode VTR 2. The commander modes (1, 2, and 3) are used to distinguish this camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR at commander mode VTR 2, we recommend you change the commander mode or cover the remote sensor of the VCR with black paper.

### Notas sobre el telemando

- Mantenga el sensor remoto alejado de luces intensas, como la directa del sol u otras de iluminación intensa. De lo contrario, el telemando no funcionará adecuadamente.

- Asegúrese de que no haya ningún obstáculo entre el telemando y el sensor remoto.

- Esta videocámara funciona con señales del modo de mando VTR 2. El modo de mando (1, 2 y 3) se utiliza para distinguir esta videocámara de otras videocámaras Sony para evitar una operación errónea. Si utiliza otra videocámara Sony en el modo de mando VTR 2, se recomienda cambiarlo o cubrir el sensor remoto de la videocámara con un papel negro.

### To Watch the Demonstration

You can watch a brief demonstration of pictures with titles. If the demonstration appears when you turn on the camcorder for the first time, exit the Demo mode to use your camcorder.

#### To enter Demo mode

- (1) Eject the cassette and turn the POWER switch to OFF.
- (2) Turn STANDBY up.
- (3) While holding down **▶** PLAY, turn the POWER switch to CAMERA. Demonstration starts. The demonstration stops when you insert the cassette.

Note that once you enter Demo mode, this mode is retained as long as the lithium battery is in place. Therefore, demonstration starts automatically 10 minutes later every time you turn the POWER switch to CAMERA, or after you eject the cassette.

#### To exit Demo mode

- (1) Turn the POWER switch to OFF.
- (2) Turn STANDBY up.
- (3) While holding down **■** STOP, turn the POWER switch to CAMERA.

### Para ver la demostración

Usted podrá ver una corta demostración de las imágenes con títulos. Si aparece la demostración al conectar la alimentación de la videocámara por primera vez, salga del modo de demostración para utilizar la videocámara.

#### Para entrar en el modo de demostración

- (1) Expulse el videocassette y gire el selector POWER hasta OFF.
- (2) Gire STANDBY hacia arriba.
- (3) Manteniendo presionada **▶** PLAY hacia abajo, gire el selector POWER hasta CAMERA. La demostración comenzará y cesará cuando inserte un videocassette.

Tenga en cuenta que una vez que haya entrado en el modo de demostración, este modo se mantendrá mientras la pila de litio esté en su lugar. Por lo tanto, la demostración comenzará automáticamente después de 10 minutos cada vez que gire el selector POWER hasta CAMERA, o después de expulsar el videocassette.

#### Para salir del modo de demostración

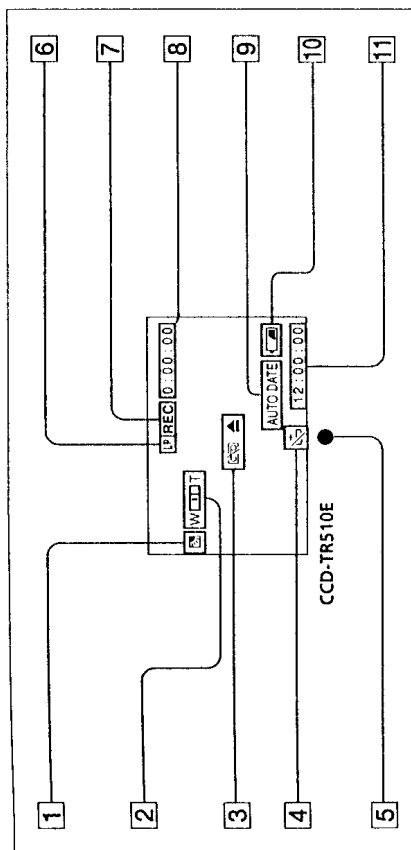
- (1) Gire el selector POWER hasta OFF.
- (2) Gire STANDBY hacia arriba.
- (3) Manteniendo presionada **■** STOP hacia abajo, gire el selector POWER hasta CAMERA.

### In the Viewfinder

The indicators appear in CAMERA mode only.

### En el visor

Los indicadores aparecerán solamente en el modo CAMERA.



1. Back light indicator (p. 29)
2. Power zoom indicator (p. 16) For CCD-TR510E only
3. Warning indicator (p. 70)
4. Lithium battery indicator (p. 38)
5. Recording lamp/battery lamp (p. 12)
6. Recording in LP mode (p. 12)
7. Tape transport mode (p. 12)
8. Tape counter (p. 14)
9. AUTO DATE indicator (p. 12)
10. Remaining battery indicator (p. 42)
11. Date, Time or Title (p. 28, 33)

1. Indicador de videofilmación a contraluz (pág. 29)
2. Indicador del zoom motorizado (pág. 16) Para la CCD-TR510E solamente
3. Indicador de advertencia (pág. 70)
4. Indicador de estado de la pila de litio (pág. 38)
5. Lámpara indicadora de videofilmación/ estado de la batería (pág. 12)
6. Grabación en el modo LP (pág. 12)
7. Modo de transporte de la cinta (pág. 12)
8. Contador de la cinta (pág. 14)
9. Indicador de grabación automática de la fecha (AUTO DATE) (pág. 12)
10. Indicador de carga restante de la batería (pág. 42)
11. Fecha, hora o título (pág. 28, 33)

## Warning Indicators

## Indicadores de advertencia

All indicators appear only when you use the camcorder in CAMERA mode.  
If indicators flash in the viewfinder, or a caution lamp on the camcorder flashes, check the following:

Todos los indicadores aparecerán solamente cuando utilice la videocámara en el modo CAMERA. Si parpadean indicadores en el visor, o una lámpara de precaución en la videocámara, verifique los puntos siguientes:

♪: You can hear the beep sound when BEEP is set to ON (p. 36).

♪: Si ajusta BEEP a ON, podrá oír los pitidos (p. 36).

1	2	3
4	5	6
7	8	9

1 Battery Remaining  
Slow flashing: The battery is weak.  
Fast flashing: The battery is dead.

1 Carga restante de la batería  
Parpadeo lento: La batería está débil.  
Parpadeo rápido: La batería está agotada.

2 The tape is near the end.

2 La cinta está a punto de finalizar.

3 The tape has run out.

3 La cinta ha finalizado.

4 No tape has been inserted.

4 No hay videocassette insertado.

5 The tab on the tape is out (red) (p.11).

5 La lengüeta del videocassette está al descubierto (roja) (pág.11).

6 Moisture condensation has occurred (p.46).  
▲ indicator appears only when the cassette is inserted.

6 Se ha producido condensación de humedad (pág.46).  
El indicador ▲ aparecerá solamente cuando esté insertado un videocassette.

7 The video heads may be contaminated (p.48).

7 Las cabezas de vídeo pueden estar contaminadas (pág.48).

8 Some other trouble has occurred.  
Disconnect the power source and contact your Sony dealer or local authorized facility.

8 Se ha producido algún otro problema.  
Desconecte la fuente de alimentación y póngase en contacto con su proveedor Sony o una estación de servicio autorizada local.

9 The lithium battery is weak or the lithium battery is not installed (p. 38).  
This indicator flashes just only after powering on.

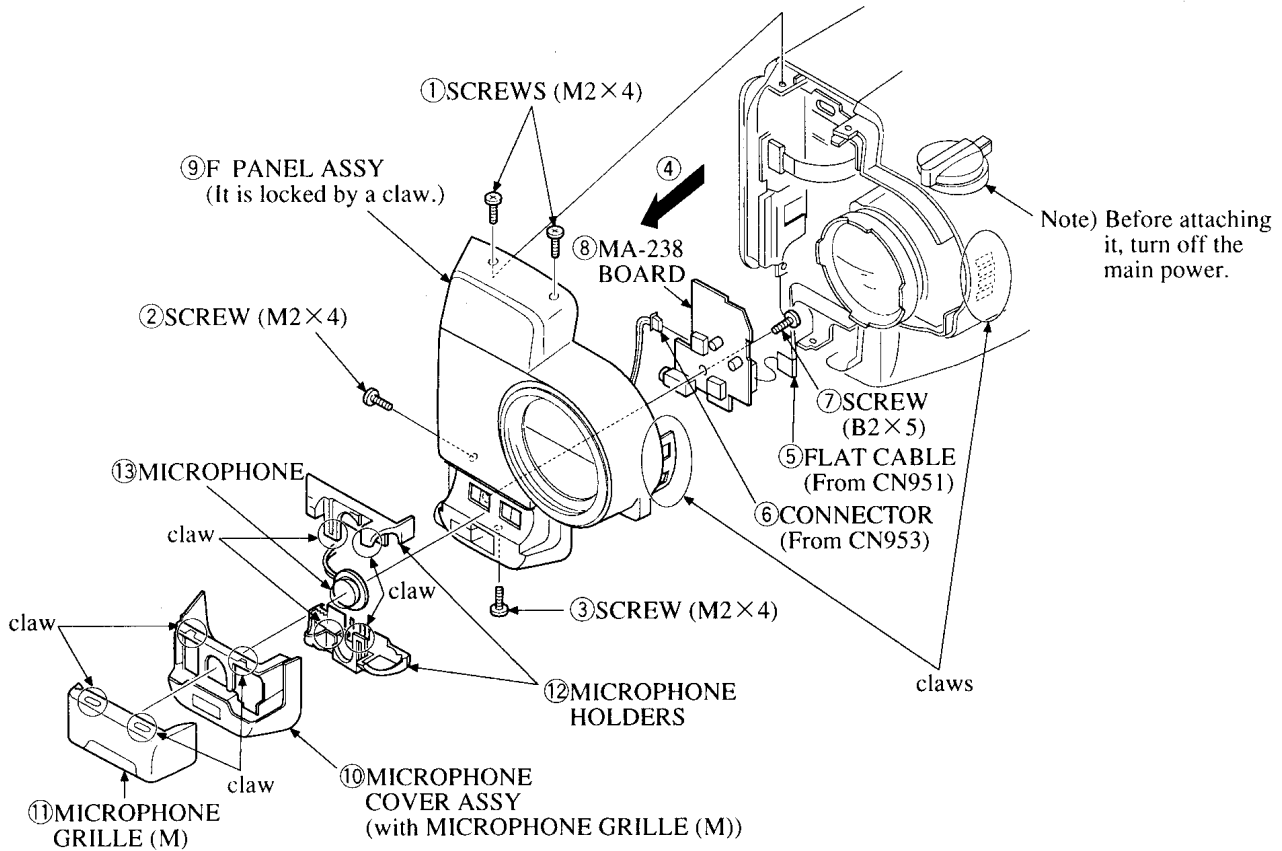
9 La pila de litio está débil, o no está colocada (pág. 38).  
Este indicador parpadeará solamente después de conectar la alimentación.



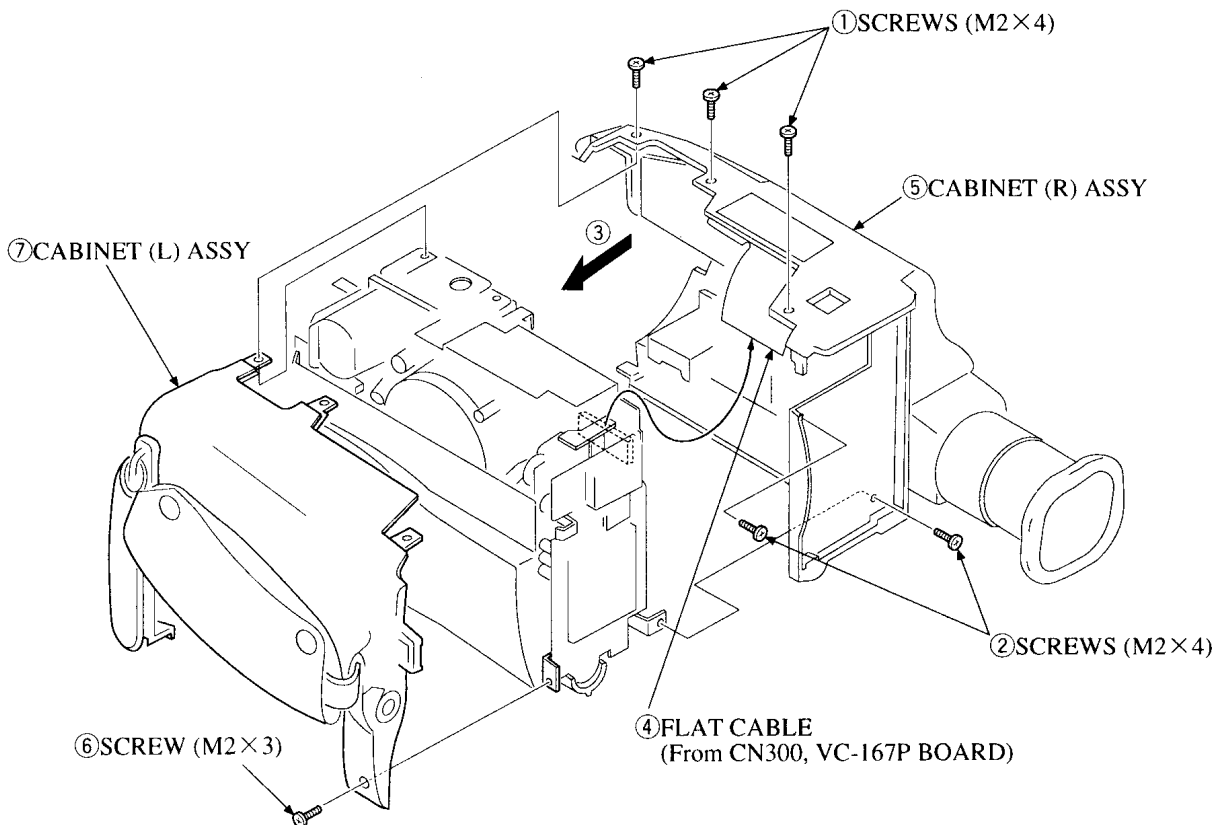
## SECTION 2 DISASSEMBLY

NOTE : Follow the disassembly procedure in the numerical order given.

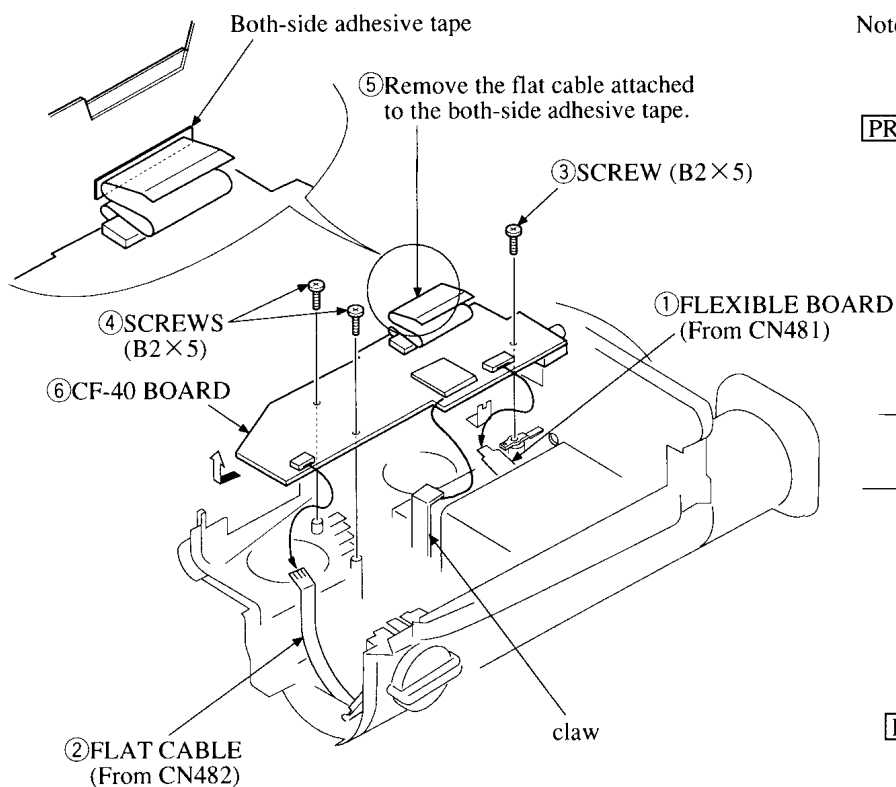
### 2-1. REMOVAL OF F PANEL ASSY, MA-238 BOARD and MICROPHONE



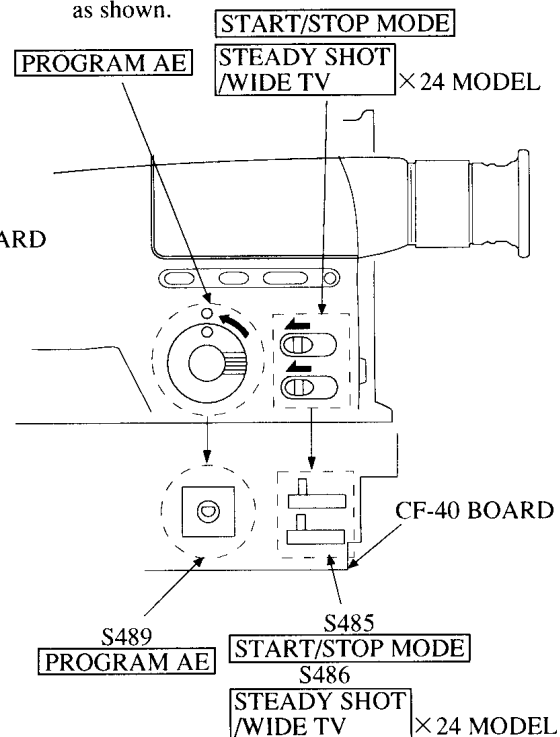
### 2-2. REMOVAL OF CABINET ASSY



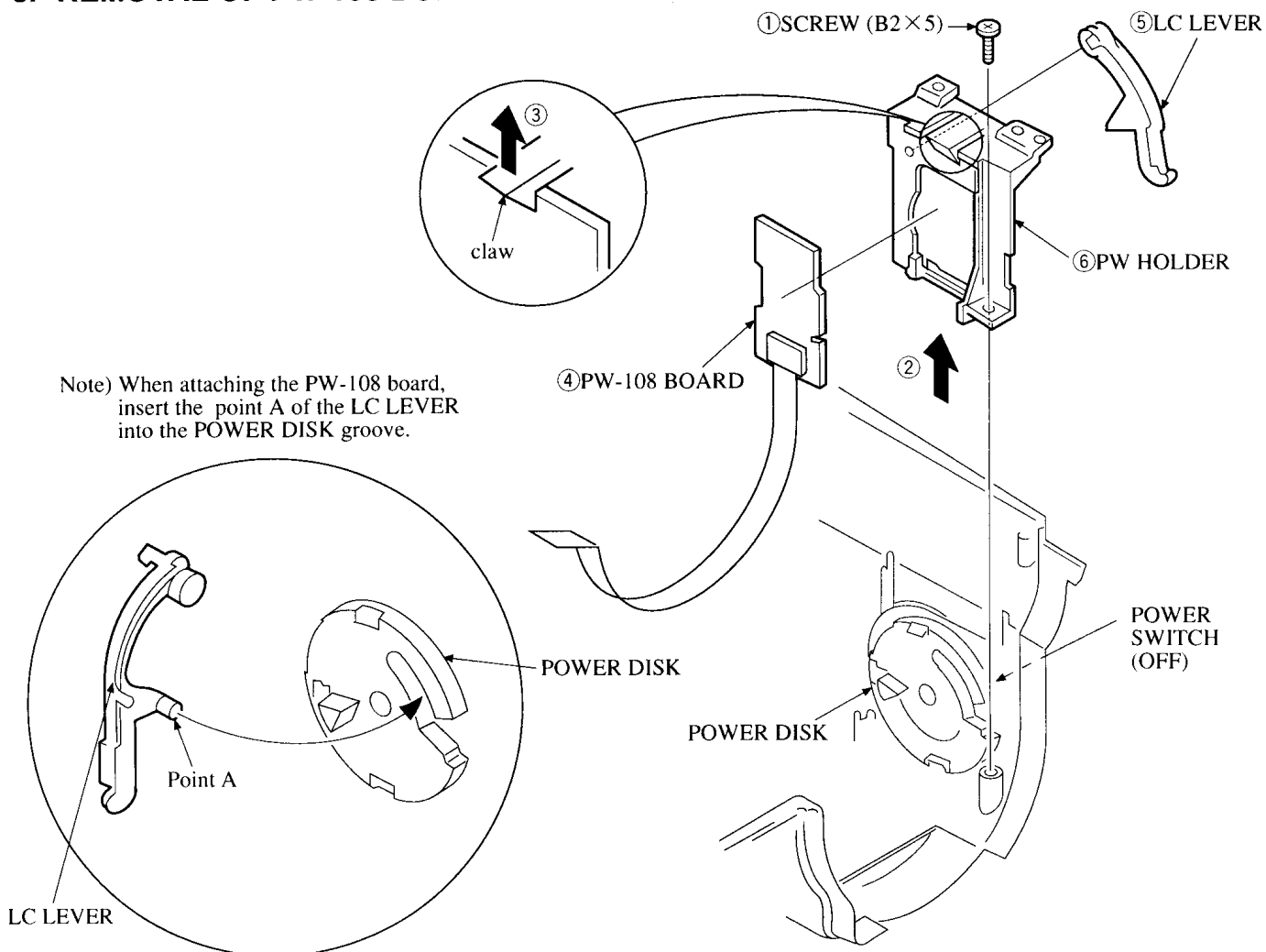
## 2-7. REMOVAL OF CF-40 BOARD



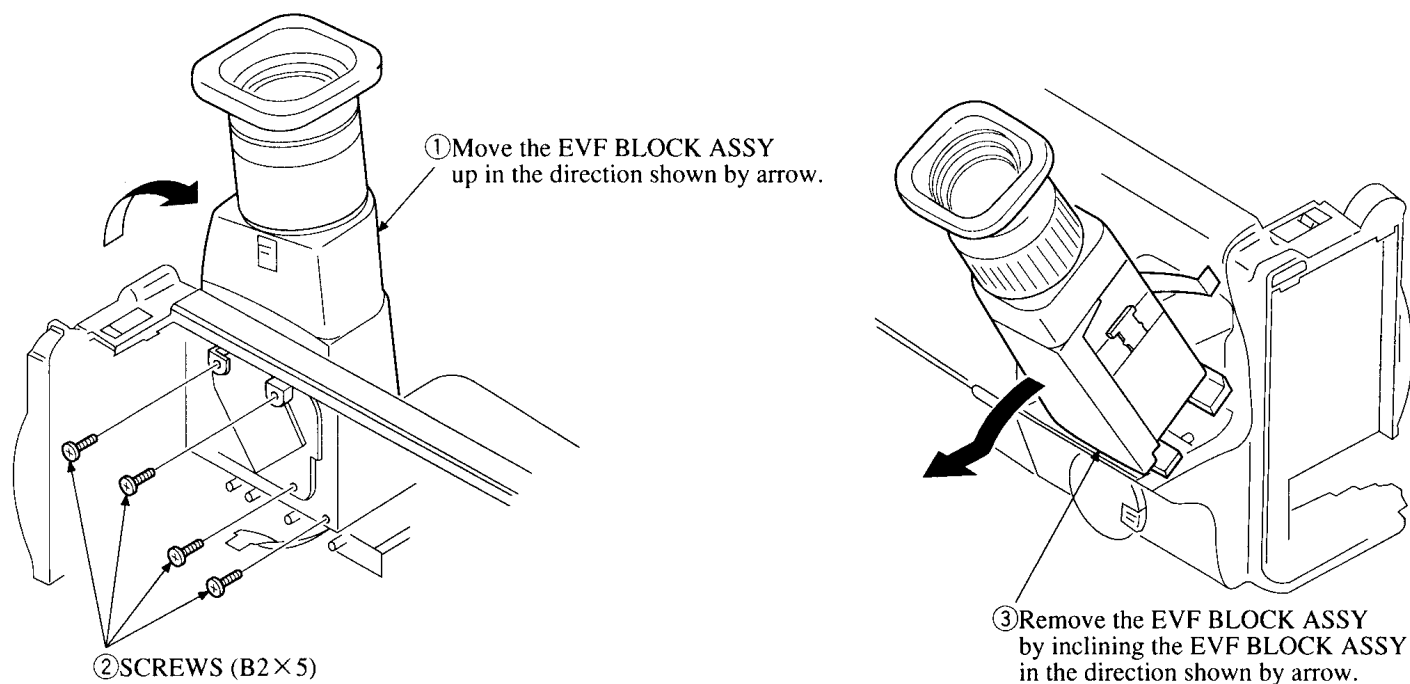
Note) When attaching the CF-40 board, set the switches in the positions as shown.



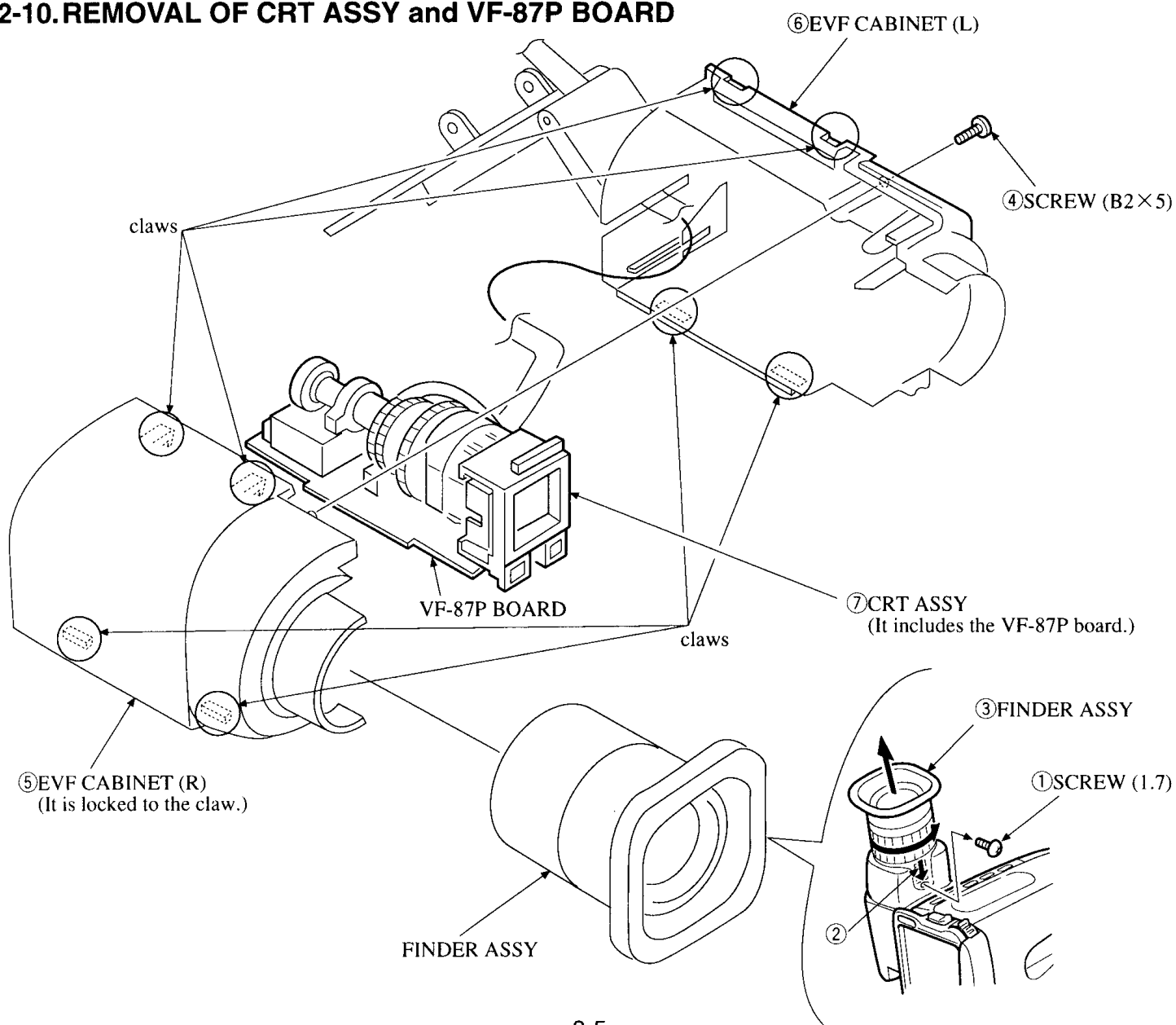
## 2-8. REMOVAL OF PW-108 BOARD



## 2-9. REMOVAL OF EVF BLOCK ASSY

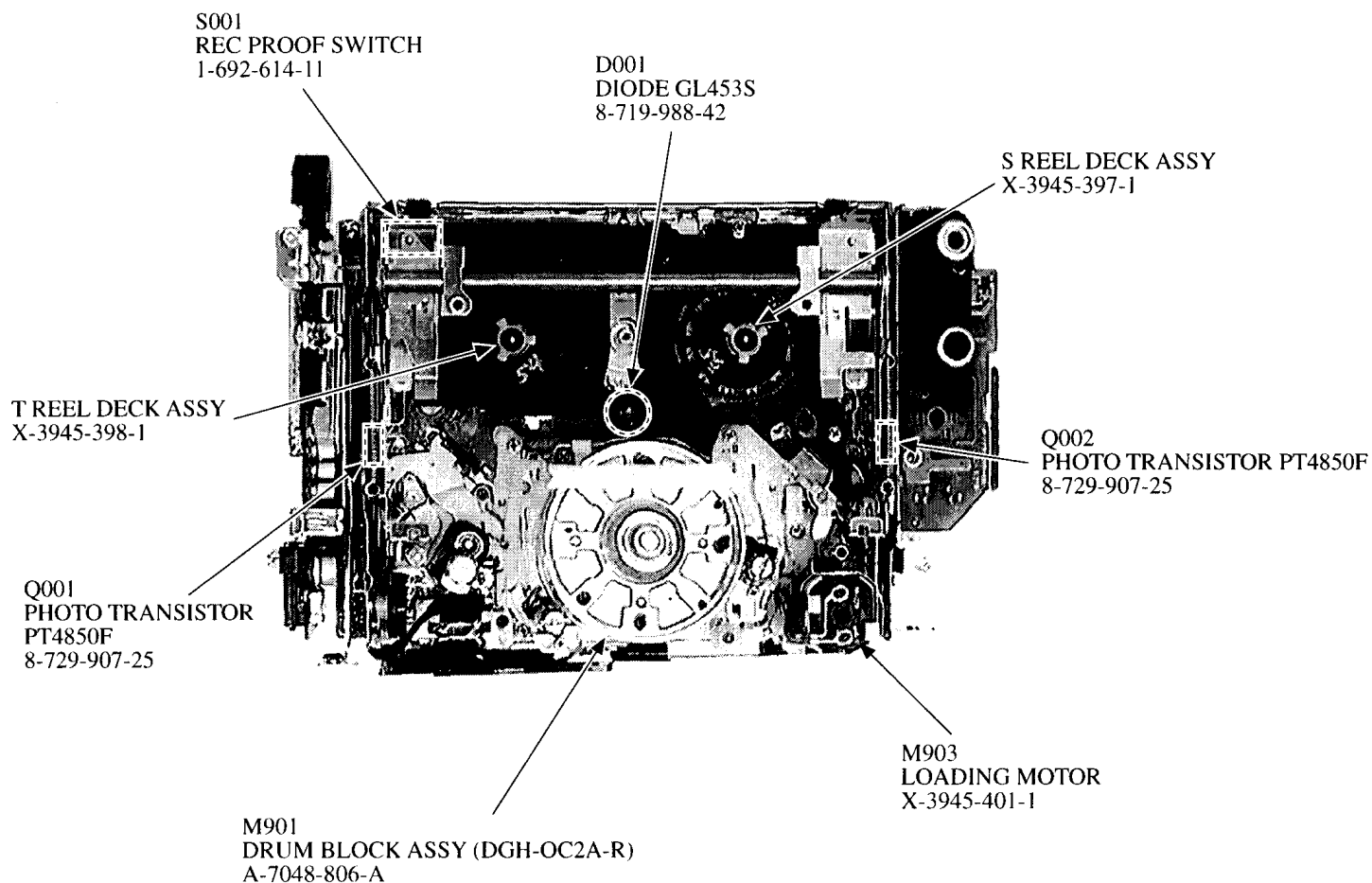


## 2-10. REMOVAL OF CRT ASSY and VF-87P BOARD



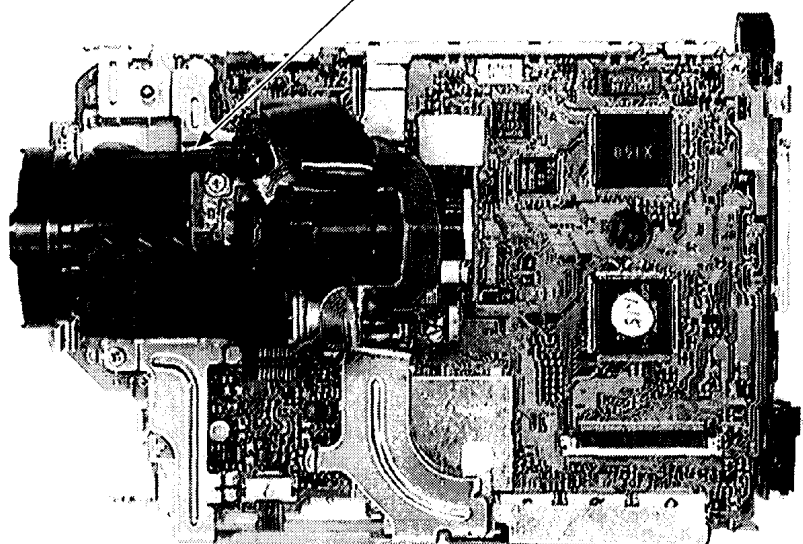
## 2-11.INTERNAL VIEWS

### —LEFT SIDE—

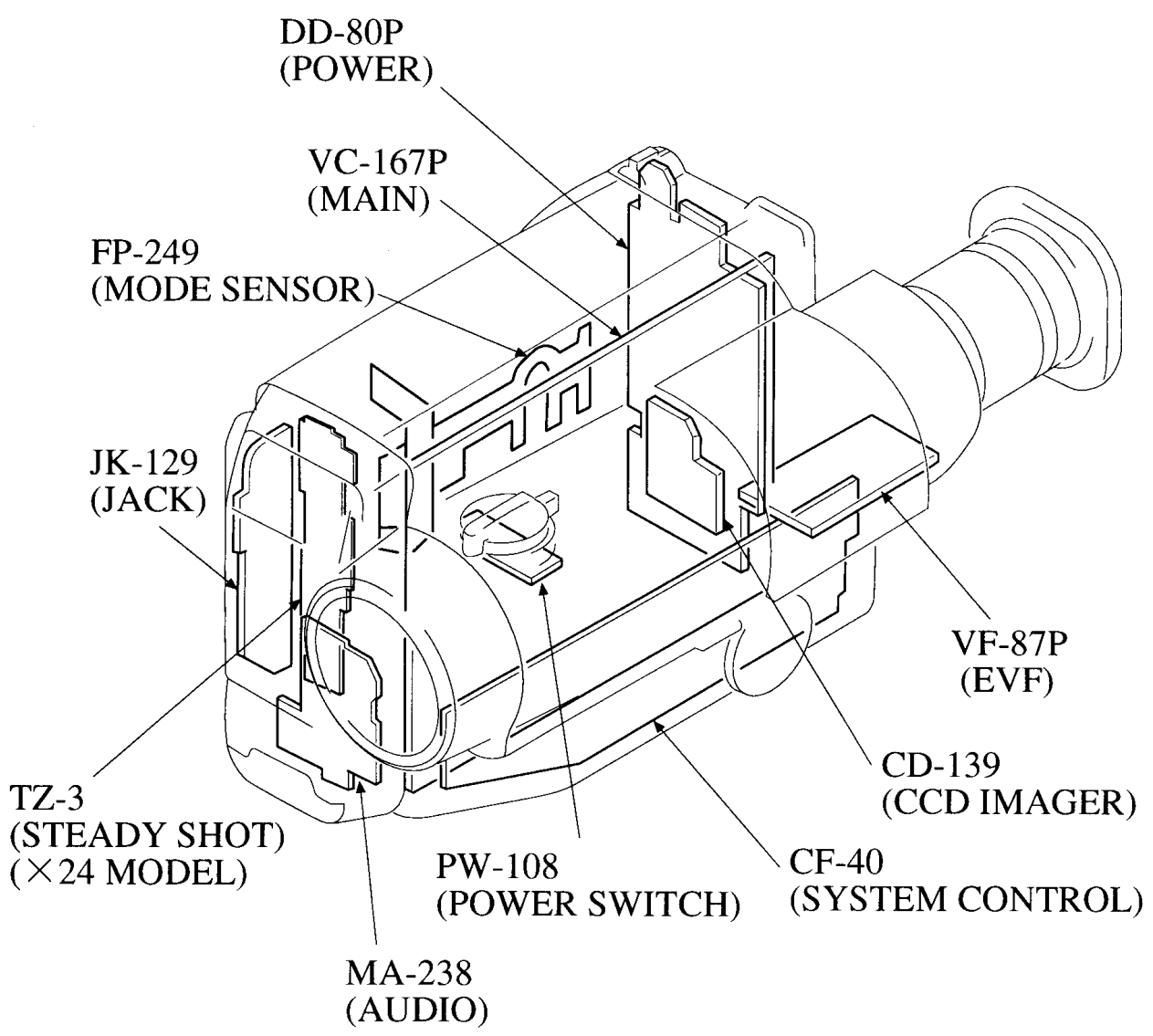


### —RIGHT SIDE—

ZOOM LENS (VCL-6310WA) (×10 MODEL)  
1-547-833-11  
ZOOM LENS (VCL-5412WB) (×24 MODEL)  
1-547-739-21

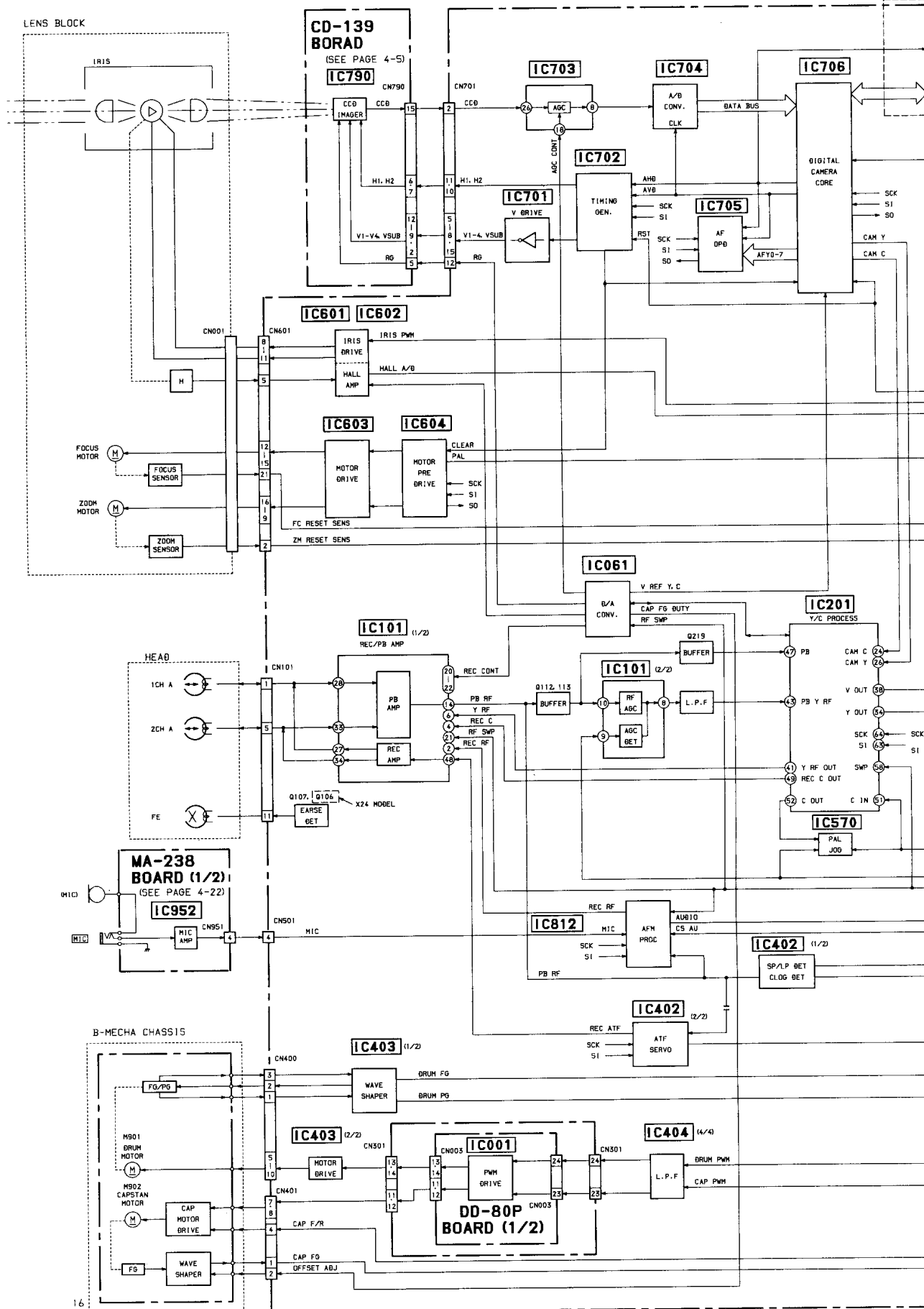


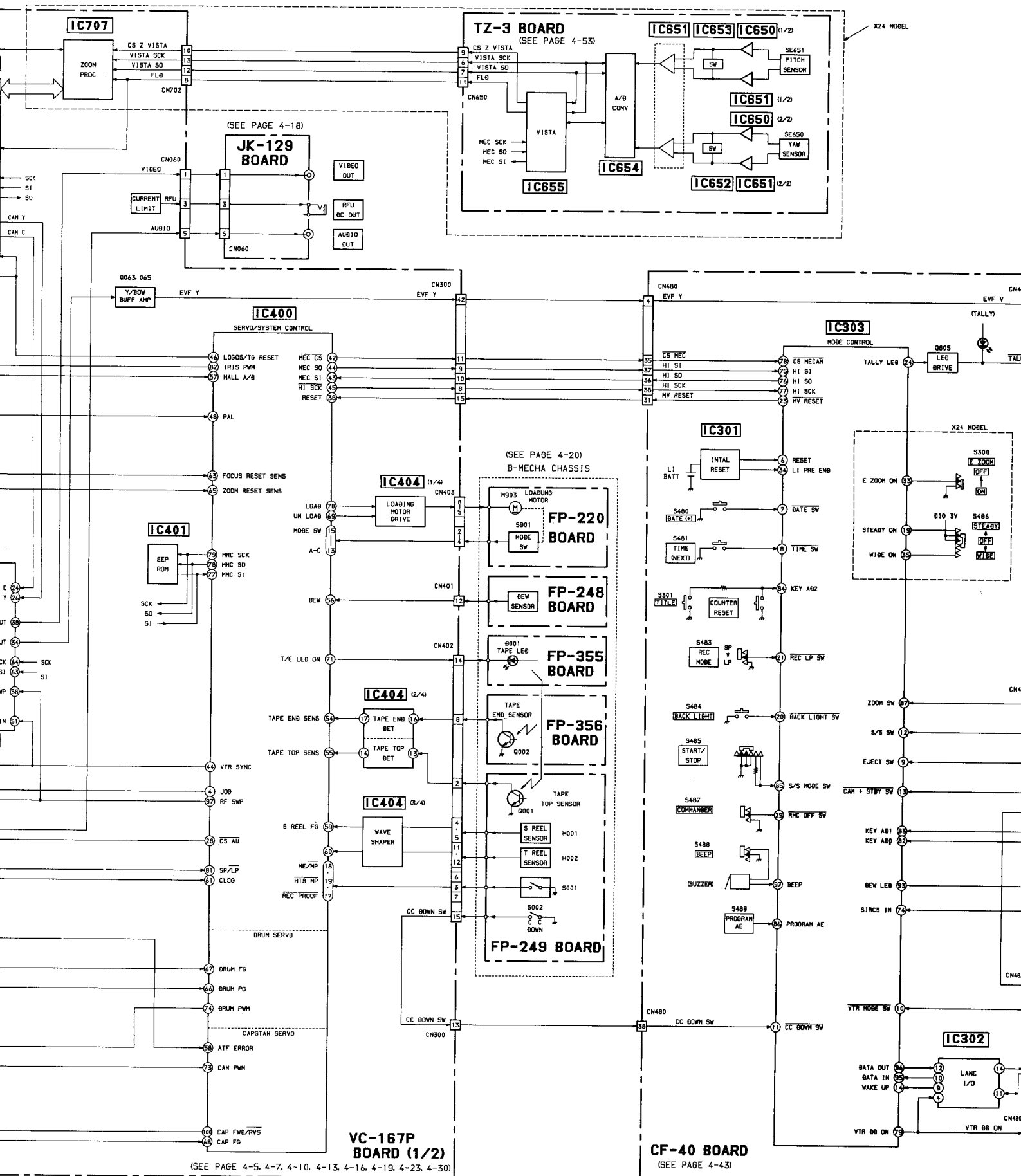
**2-12. CIRCUIT BOARDS LOCATION**



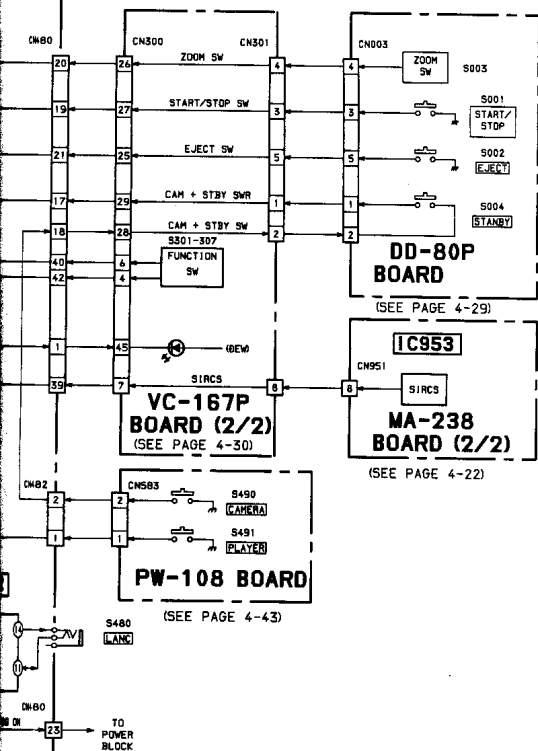
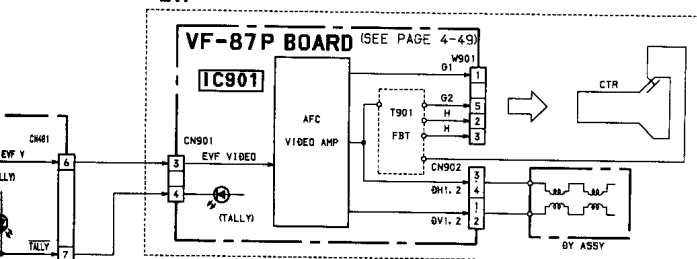
# SECTION 3 BLOCK DIAGRAMS

## 3-1. OVERALL BLOCK DIAGRAM



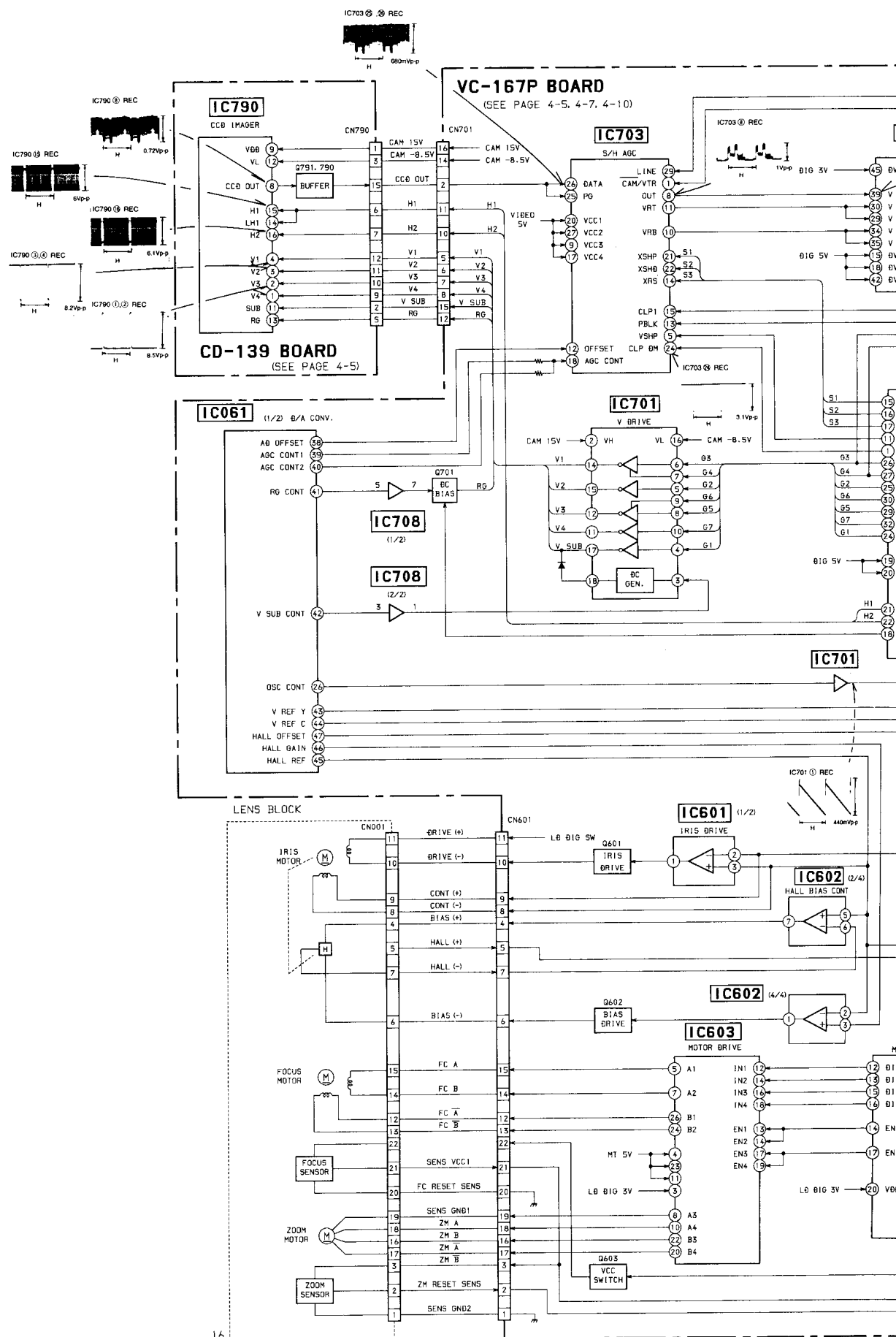


EVF

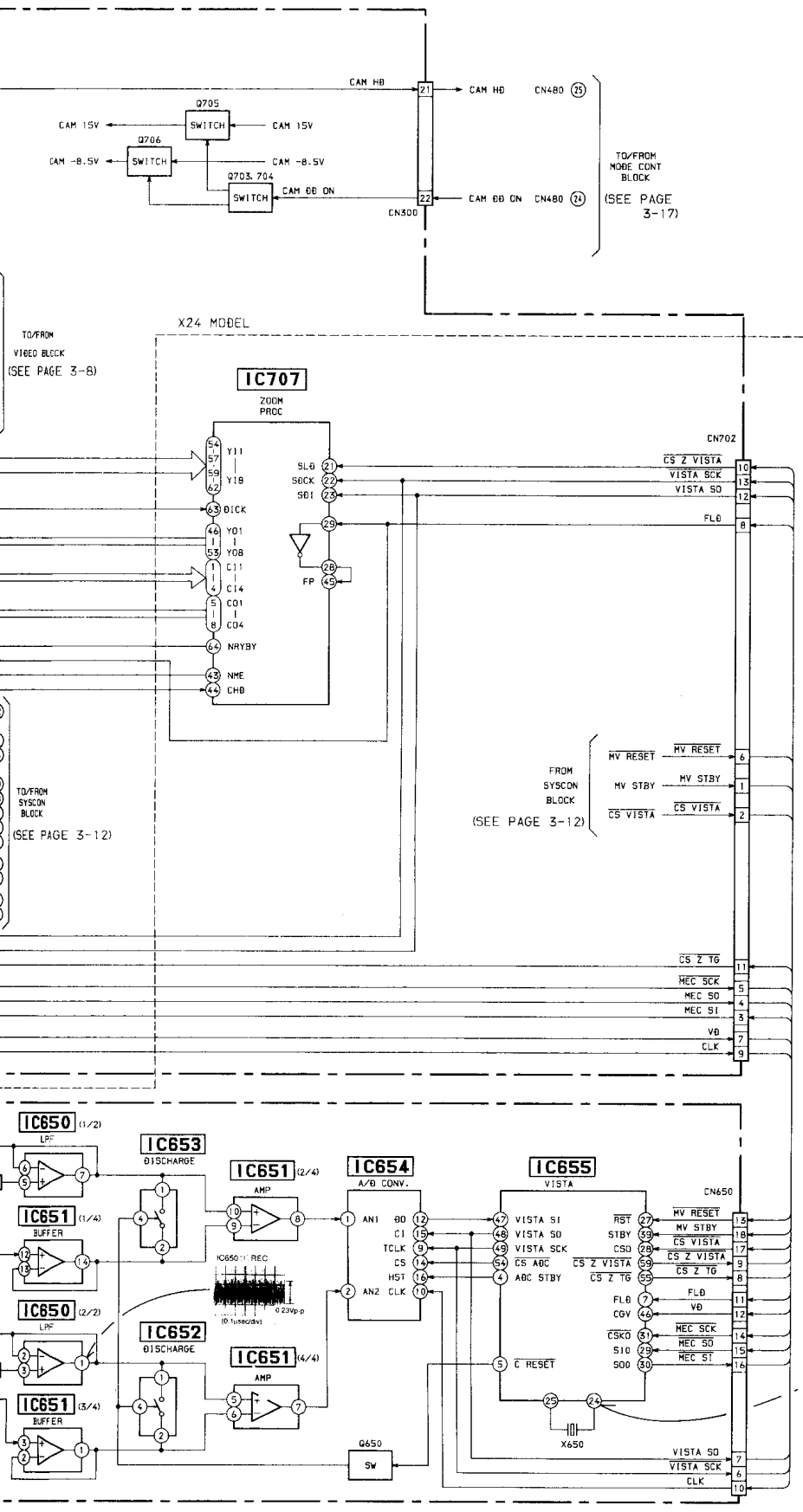




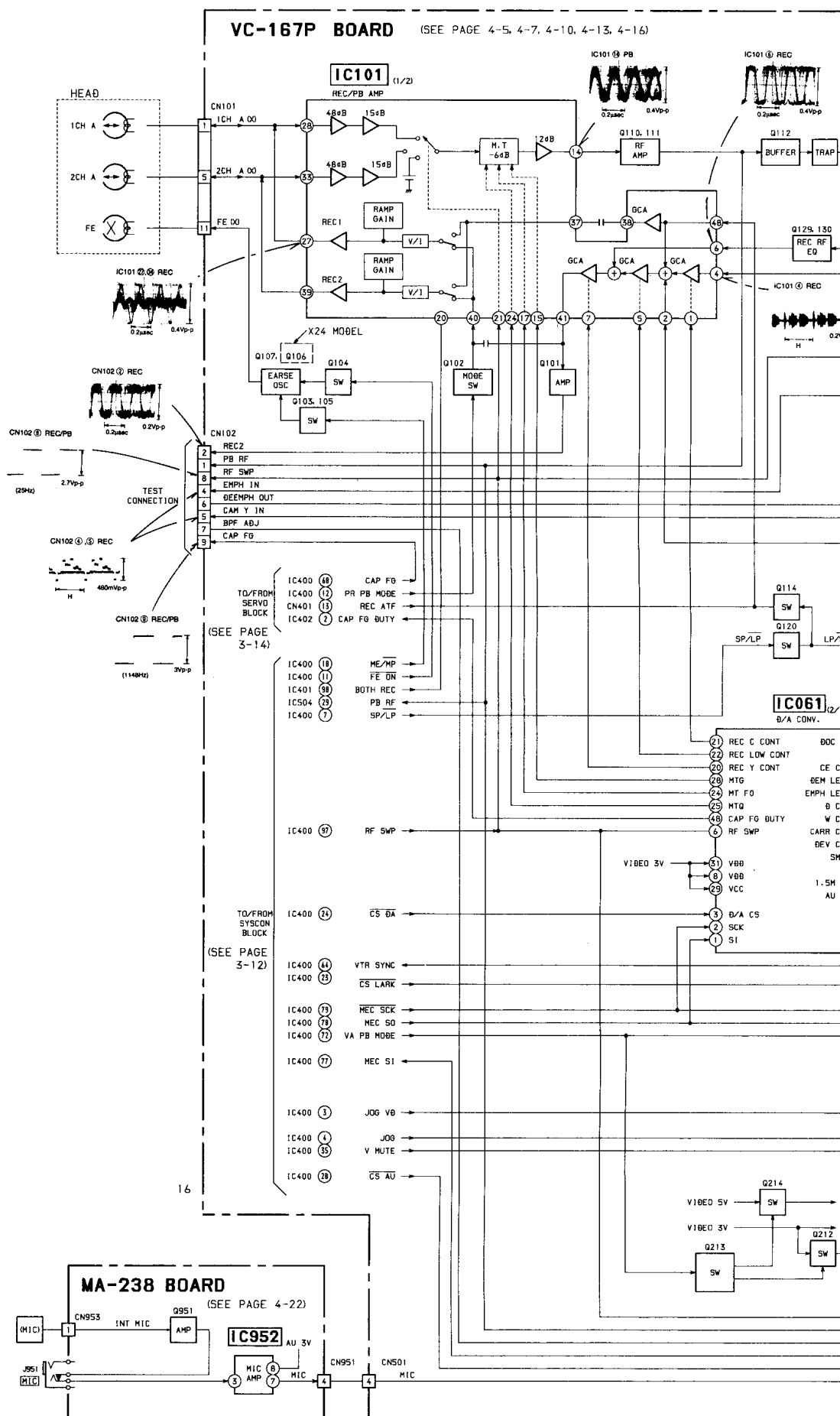
### 3-2. CAMERA BLOCK DIAGRAM







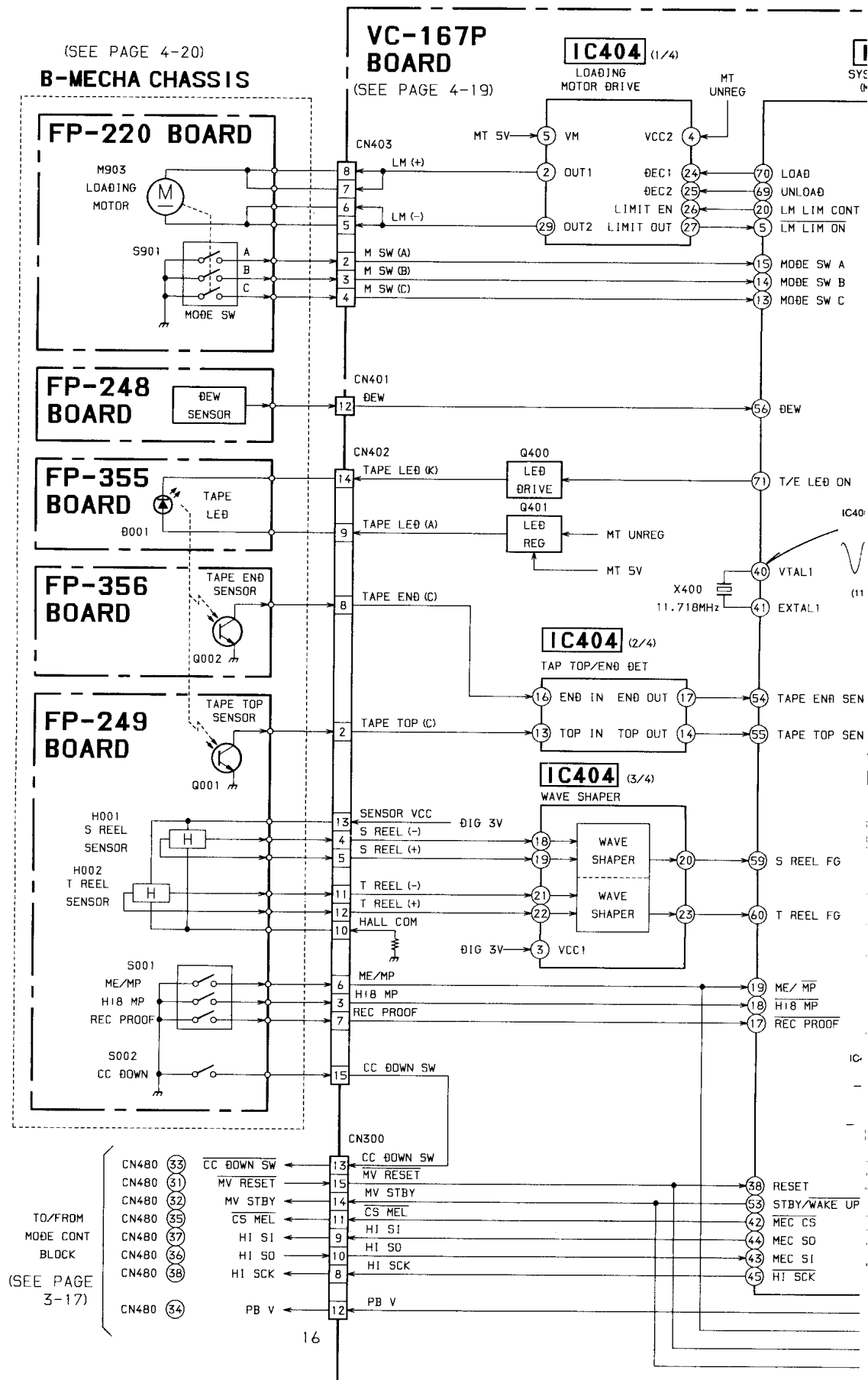
### 3-3. VIDEO/AUDIO BLOCK DIAGRAM



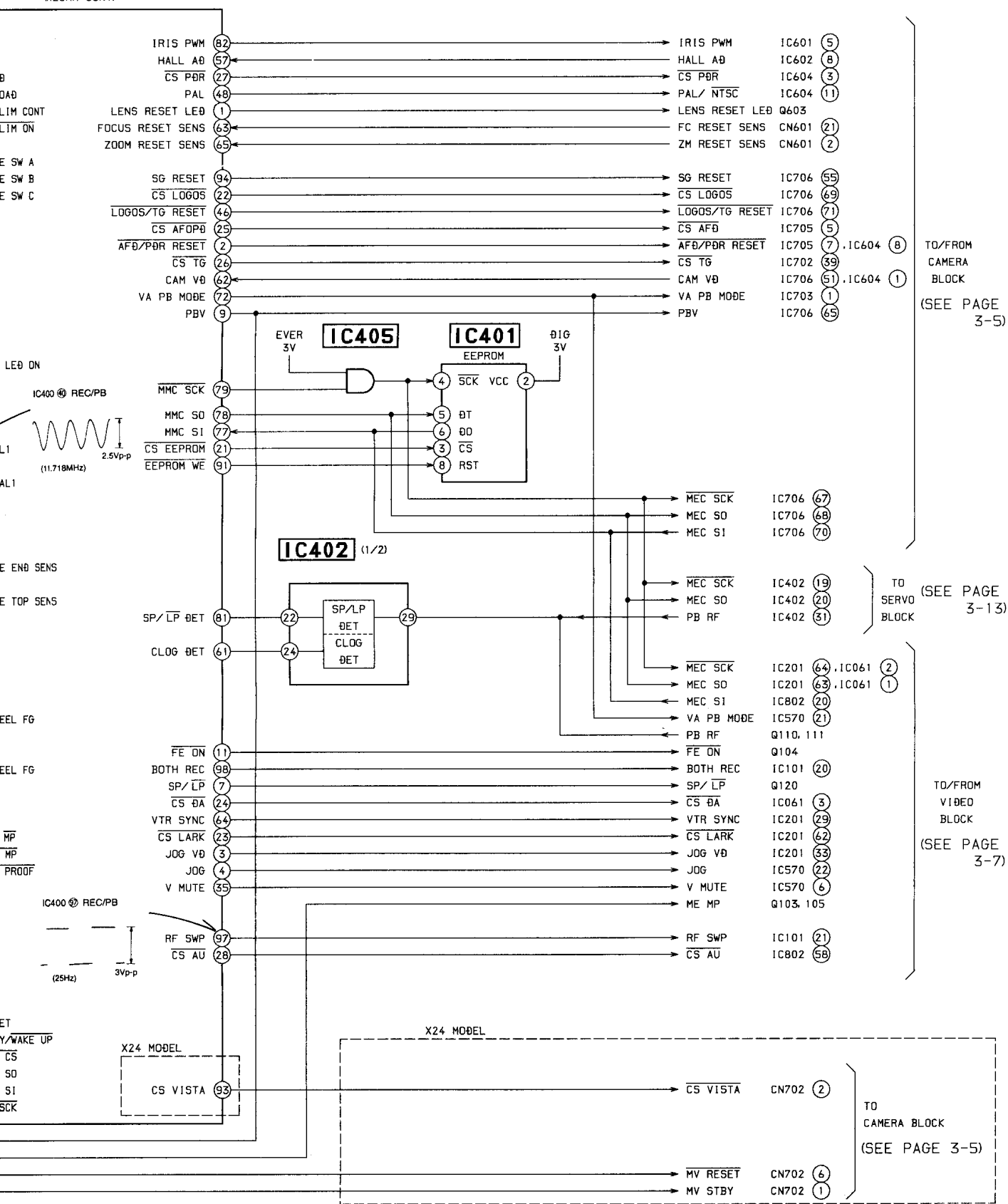




### 3-4. SYSTEM CONTROL BLOCK DIAGRAM



**IC400** (1/2)  
SYSTEM CONTROL  
(MECHA CONT)

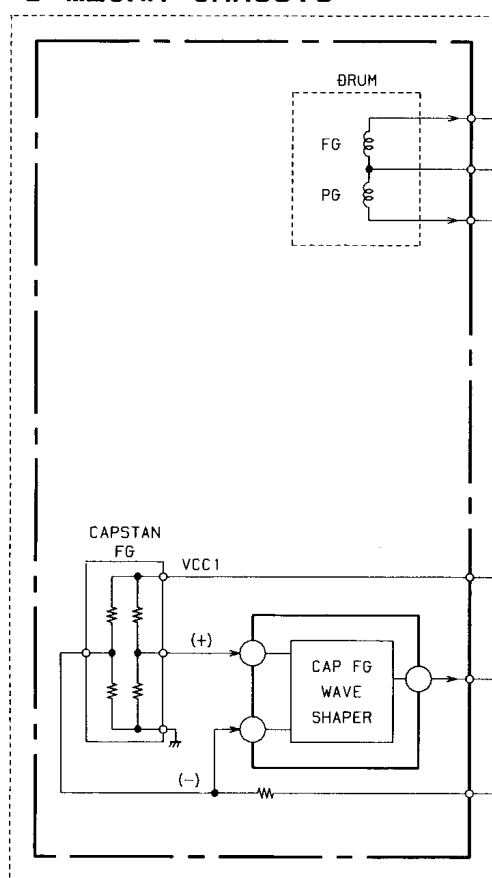




### 3-5. SERVO BLOCK DIAGRAM

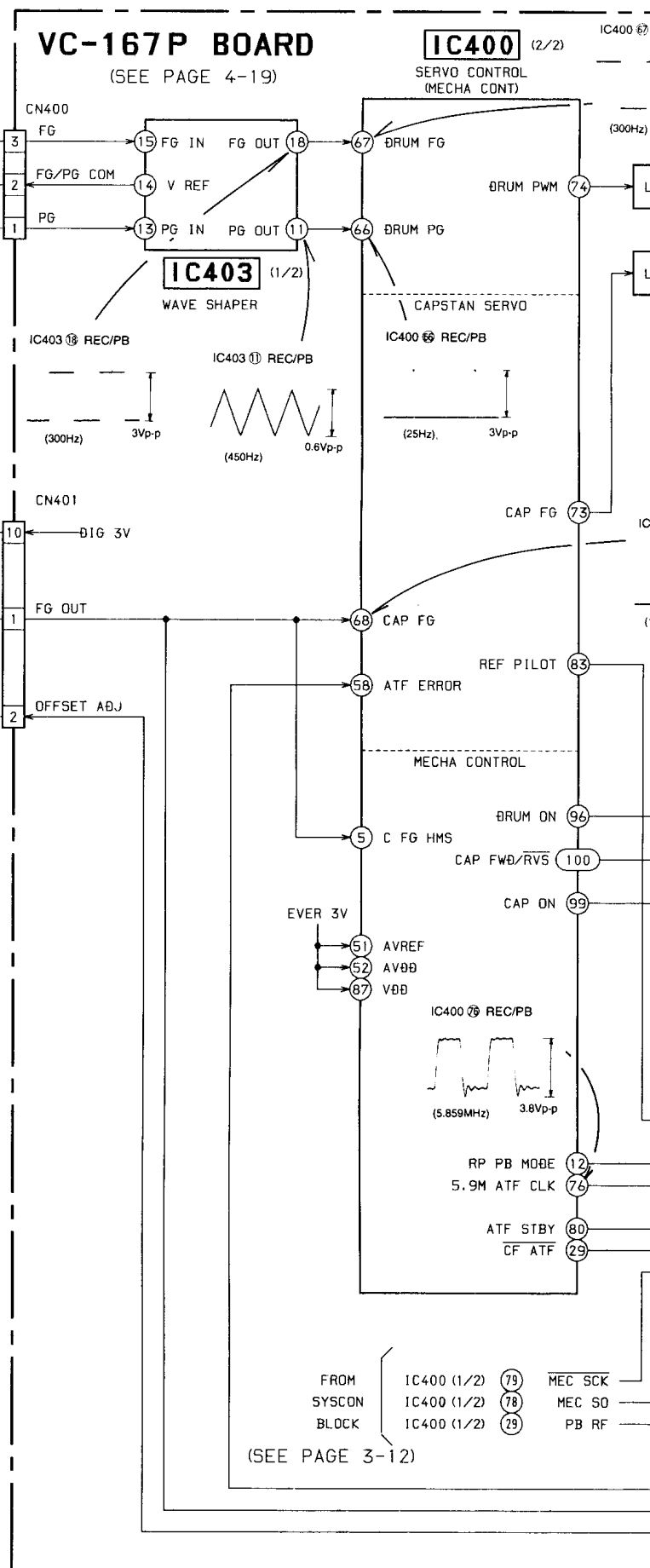
(SEE PAGE 4-19)

#### B-MECHA CHASSIS



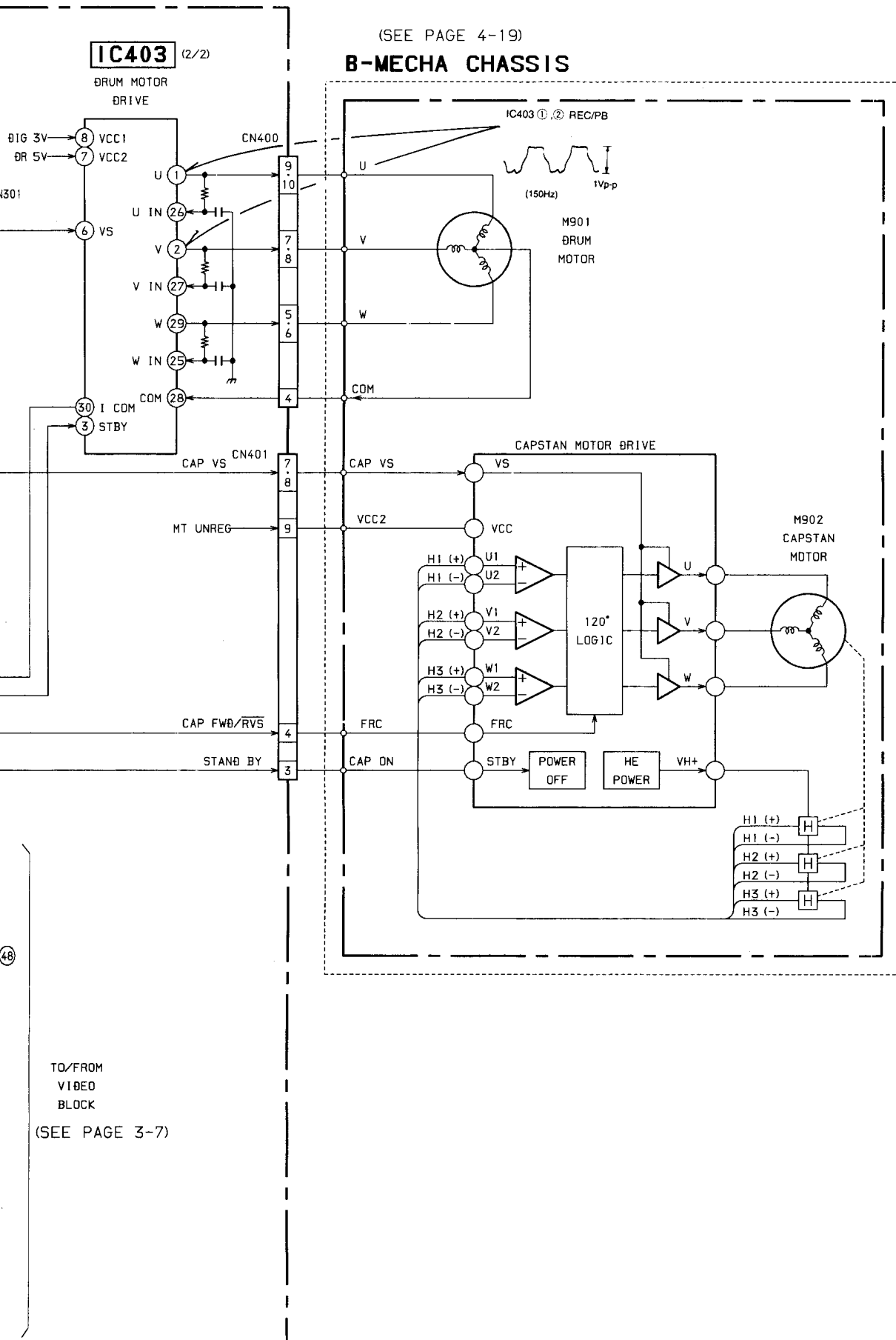
#### VC-167P BOARD

(SEE PAGE 4-19)

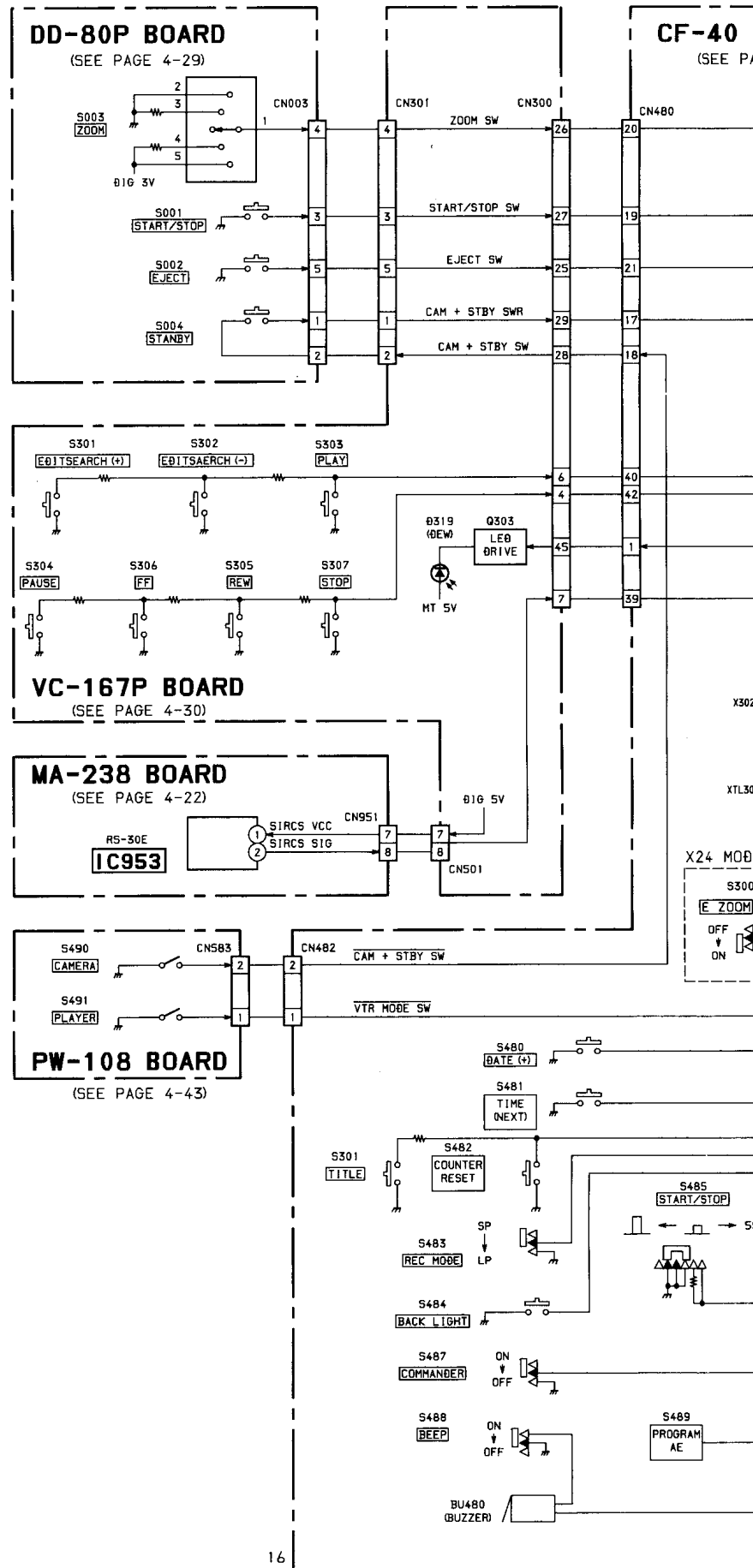


(SEE PAGE 3-12)





### 3-6. MODE CONTROL/EVF BLOCK DIAGRAM



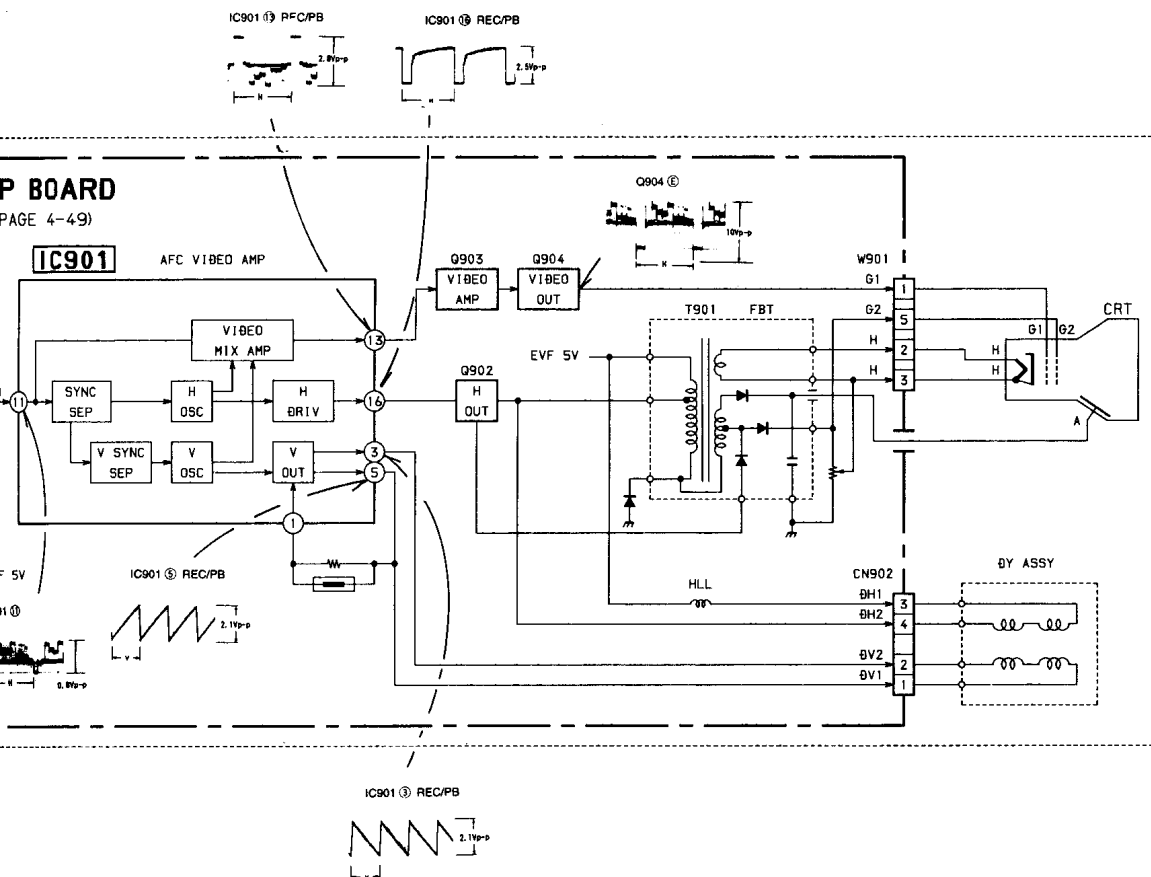
(SEE PAGE 4-43)

**IC303**



3-11)

TO/FROM  
CAMERA  
BLOCK  
SEE PAGE 3-5)

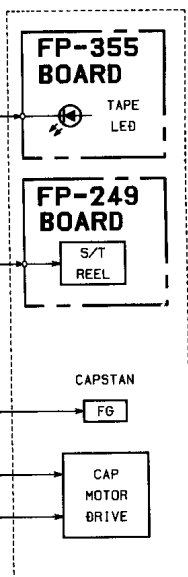
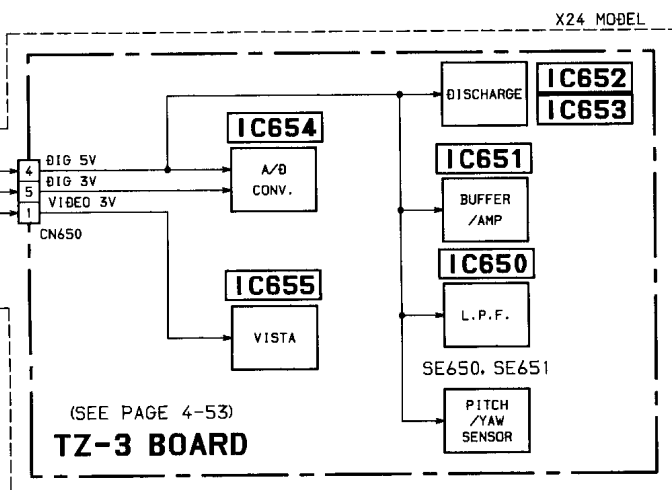
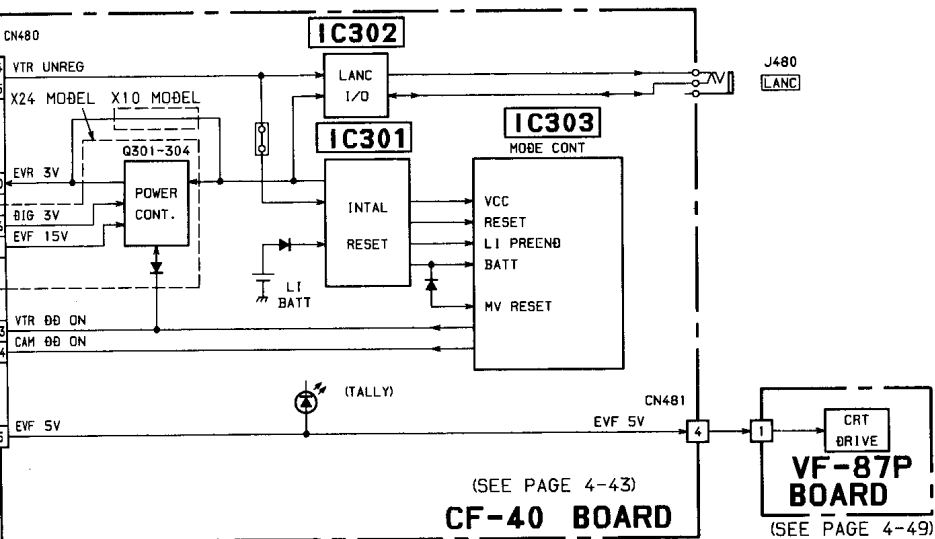


### 3-7. POWER BLOCK DIAGRAM

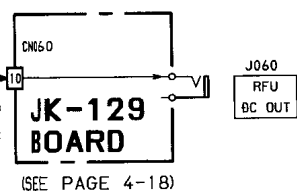








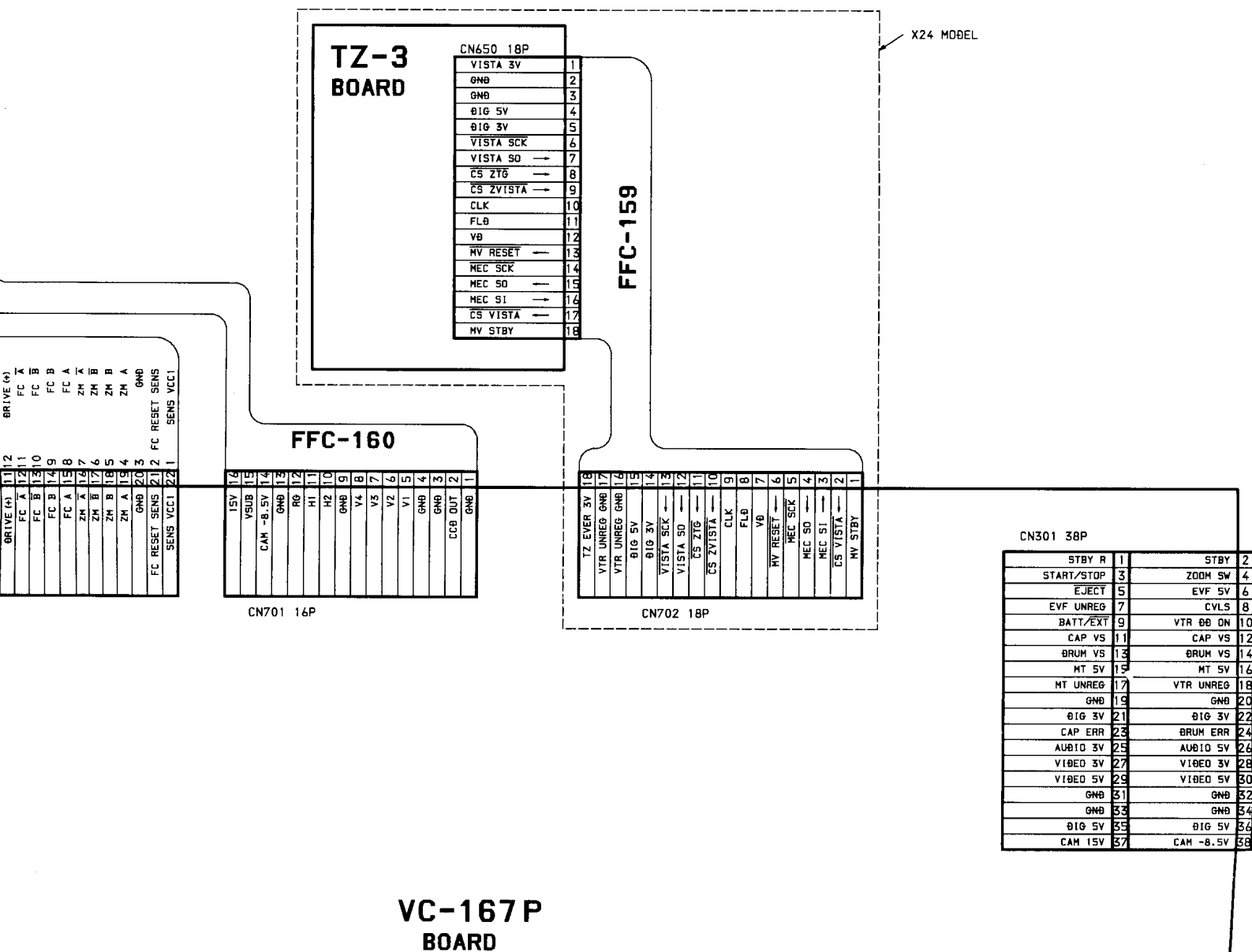
**B-MECHA CHASSIS**  
(SEE PAGE 4-20)

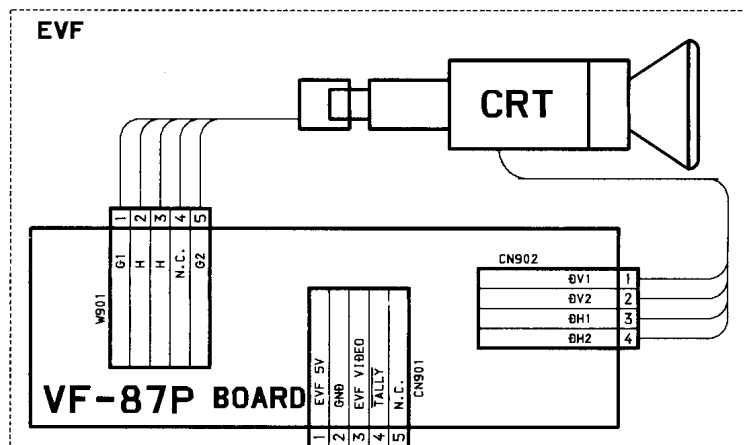




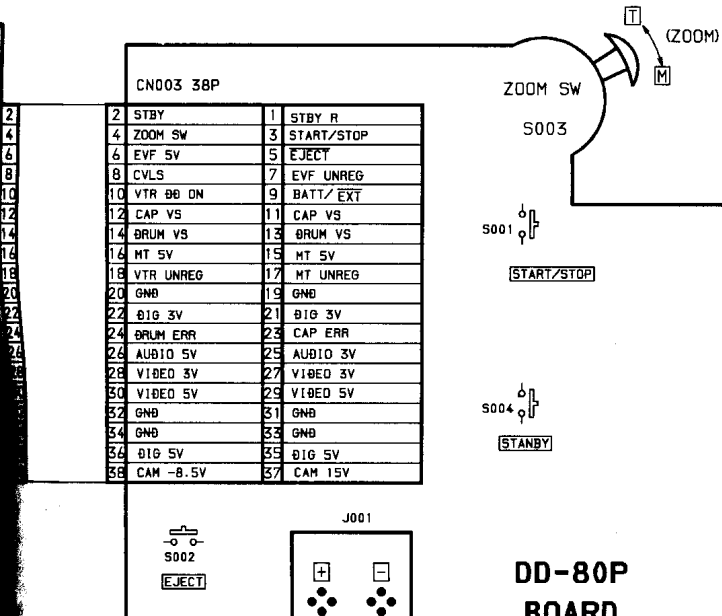
# SECTION 4 AND SCHEMATIC DIAGRAMS

8 9 10 11 12 13 14 15 16 17

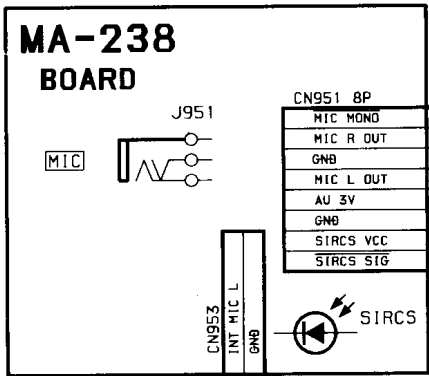
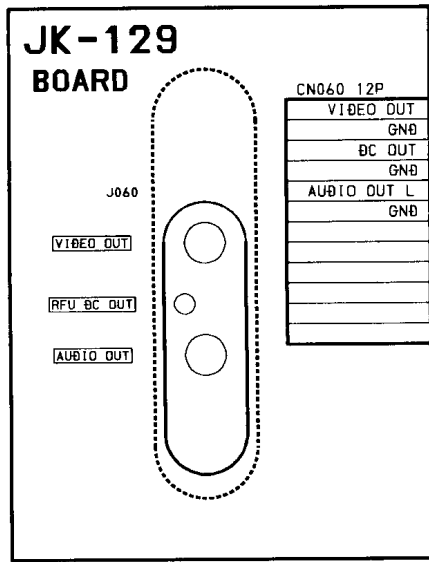




**FP-283**



B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N



CN060 12P

VIDEO OUT	12
GND	11
BC OUT	10
GND	9
AUDIO OUT L	8
GND	7
	6
	5
	4
	3
	2
	1

CN060 12P

VIDEO OUT	1
GND	2
BC OUT	3
GND	4
AUDIO OUT L	5
GND	6
	7
	8
	9
	10
	11
	12

FFC-162

CN501 8P

MIC MONO	1
MIC R OUT	2
GND	3
MIC L OUT	4
AU 3V	5
GND	6
SIRCS VCC	7
SIRCS SIG	8

FFC-161

CN951 8P

MIC MONO	1
MIC R OUT	2
GND	3
MIC L OUT	4
AU 3V	5
GND	6
SIRCS VCC	7
SIRCS SIG	8

CN102 9P

PB RF	1
REC 2	2
GND	3
EMPH IN	4
CAM Y IN	5
DEEMPH OUT	6
BPF ADJ	7
RF SWP	8
CAP F6	9

TEST CONNECTION

H1	14
H2	10
GND	9
V4	8
V3	7
V2	6
V1	5
GND	4
GND	3
CCB OUT	2
GND	1

CN601 22P

GND	1	22
ZM RESET SENS	2	21
ZM SENS VCC2	3	20
BIAS (+)	4	19
HALL (+)	5	18
BIAS (-)	6	17
HALL (-)	7	16
CONT (-)	8	15
CONT (+)	9	14
DRIVE (-)	10	13
DRIVE (+)	11	12
FC A	12	11
FC B	13	10
FC A	14	9
FC B	15	8
ZM A	16	7
ZM B	17	6
ZM A	18	5
ZM B	19	4
ZM A	20	3
ZM B	21	2
ZM A	22	1

CN403 8P

GND	1
M-SW (A)	2
M-SW (B)	3
M-SW (C)	4
LM (-)	5
LM (+)	6
LM (-)	7
LM (+)	8

CN101 11P

1CH A 00	1
1CH A 01	2
1CH A 02	3
2CH A 00	4
2CH A 01	5
2CH A 02	6
2CH A 03	7
2CH A 04	8
2CH A 05	9
2CH A 06	10
2CH A 07	11

COM GND 8

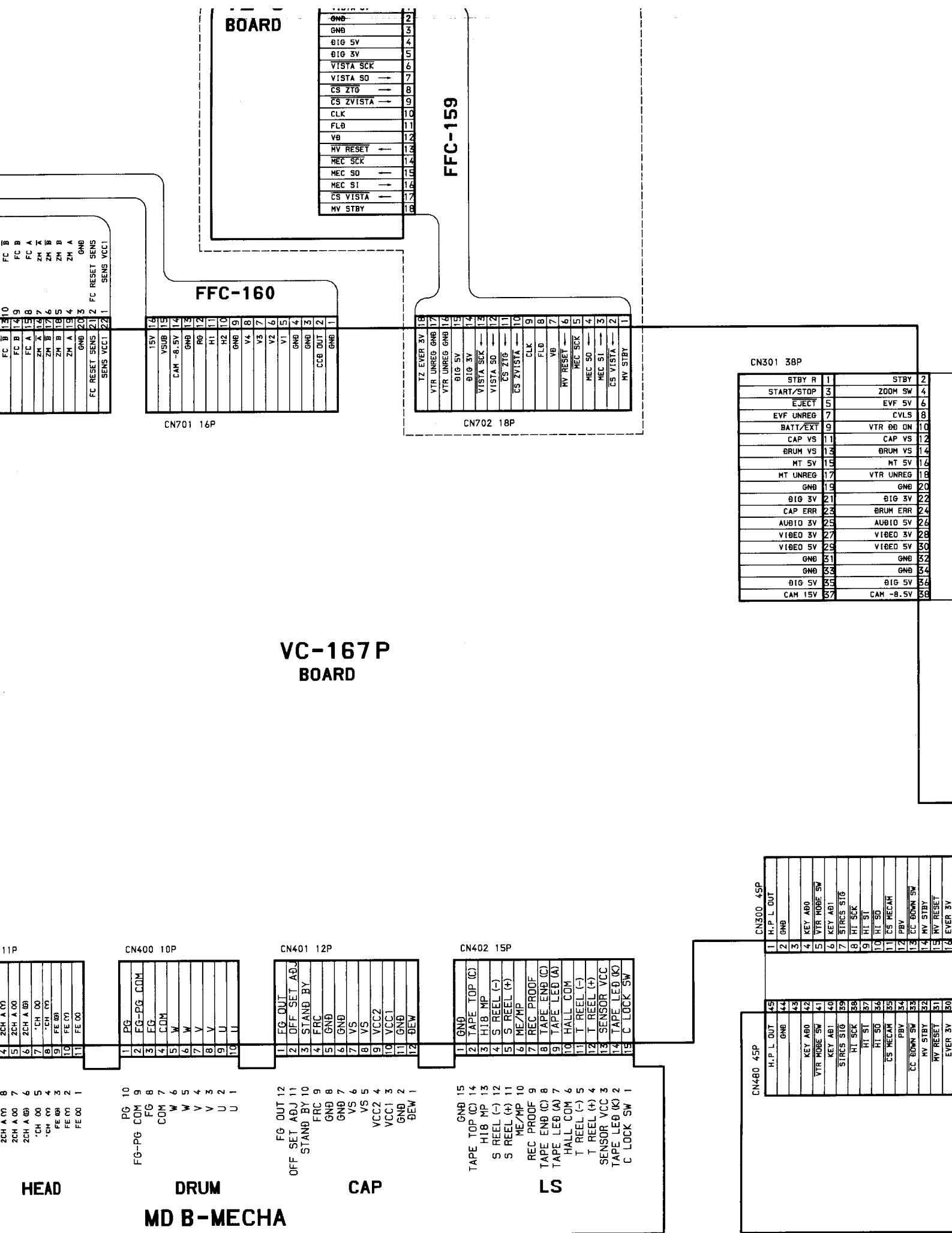
M-SW (A)	7
M-SW (B)	6
M-SW (C)	5
LM (-)	4
LM (+)	3
LM (-)	2
LM (+)	1

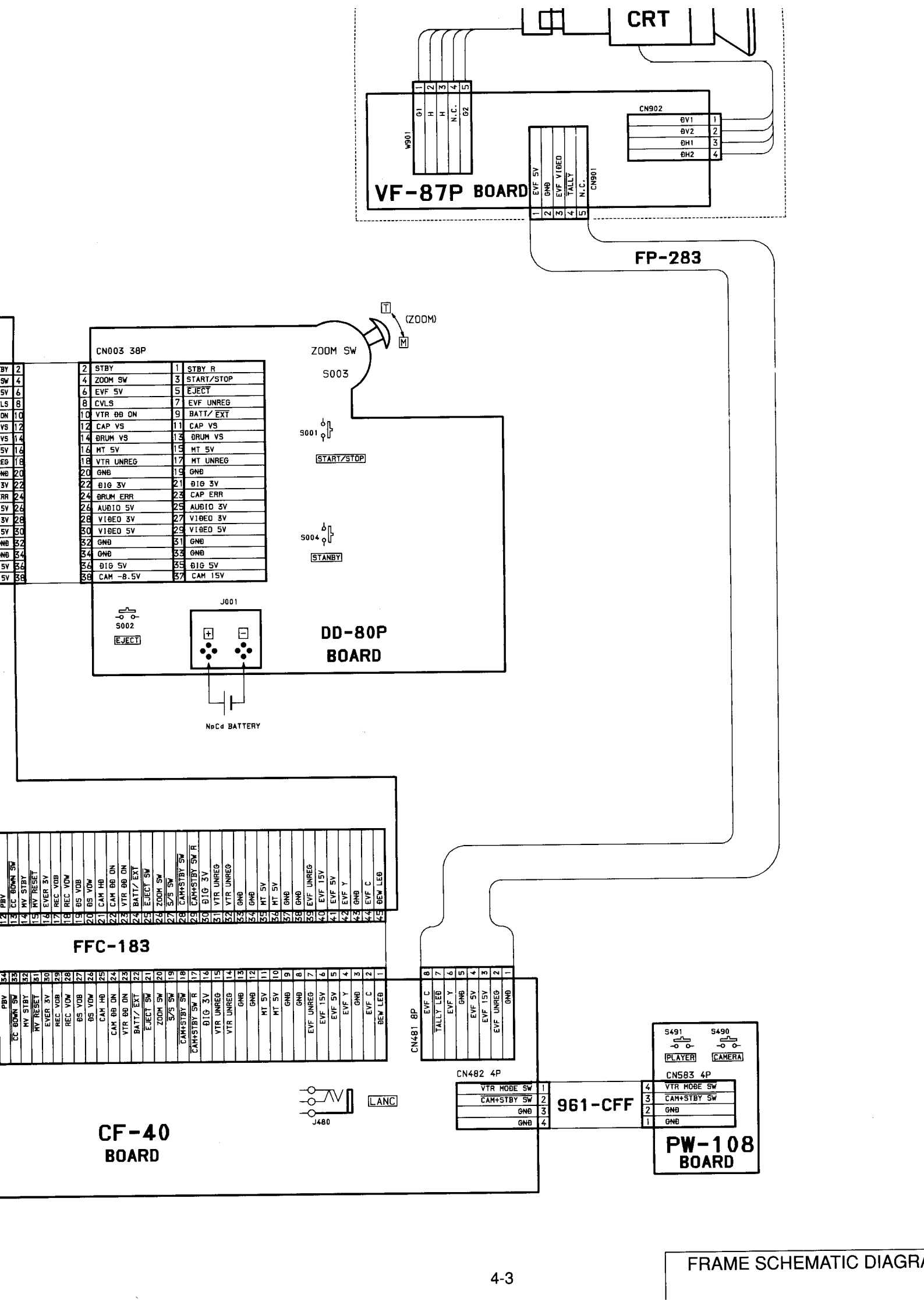
1CH A 00 11

1CH A 01	10
1CH A 02	9
2CH A 00	8
2CH A 01	7
2CH A 02	6
2CH A 03	5
2CH A 04	4
2CH A 05	3
2CH A 06	2
2CH A 07	1

M SW (LM)

HEA








## 4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

### THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.

(In addition to this, the necessary note is printed in each block.)

#### • For printed wiring boards.

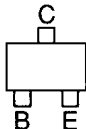
-  : indicated a lead wire mounted on the component side.
-  : Pattern from the side which enables seeing. (The other layers' patterns are not indicated.)
-  : Through hole is omitted.
- Printed wiring board which has four layers structure but inner two layers' patterns are omitted.

#### Caution:

SIDE A: The pattern face side which is seen when the upper case is opened.

SIDE B: The opposite pattern face side to the pattern seen when the upper case is opened.

- Chip parts (3-terminal transistor)



C: Collector  
B: Base  
E: Emitter

#### • For schematic diagrams.

- Caution when replacing chip parts..

New parts must be attached after removal of chip.

Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.

- All resistor are in ohms, 1/4W unless otherwise noted.


Chip resistor are 1/10W unless otherwise noted.

k $\Omega$ : 1000 $\Omega$ , M $\Omega$ , : 1000k $\Omega$ .

- All capacitors are in  $\mu$ F unless otherwise noted. pF :  $\mu$   $\mu$ F. 50V or less are not indicated except for electrolytics and tantalums.

- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.


-  : nonflammable resistor.


-  : fusible resistor.

-  : panel designation.

-  : internal component.

-  : adjustment for repair. \*

-  : B+ Line. \*

-  : B- Line. \*

-  : IN/OUT direction of (+, -) B LINE. \*

- Circled numbers refer to waveforms. \*



- Signal name

\*E/-L→E/L

\*-VAPB→VAPB

-EDIT→EDIT

\*VAPB→VAPB

**NOTE:** The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

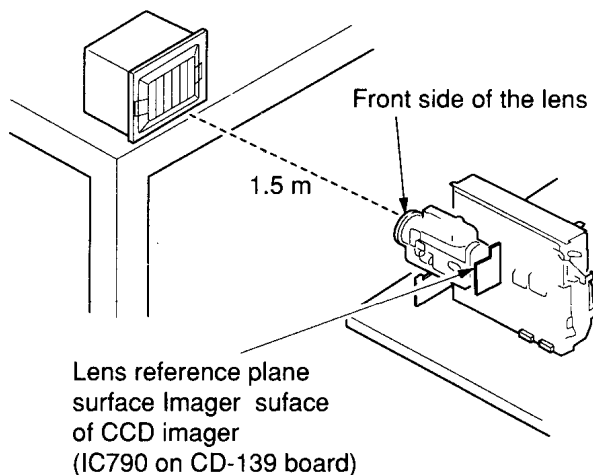
- Voltages and waveforms are measured between the measurement points and ground when camera shoots color bar chart of pattern box. They are reference values \* and reference waveforms.

(VOM of DC 10 M $\Omega$  input impedance is used.)

- Voltage values change depending upon input impedance of VOM used.)

#### 1. Connection

##### Pattern box



- 2. Adjust the distance so that the output waveform of Fig. a and the Fig. b can be obtain.

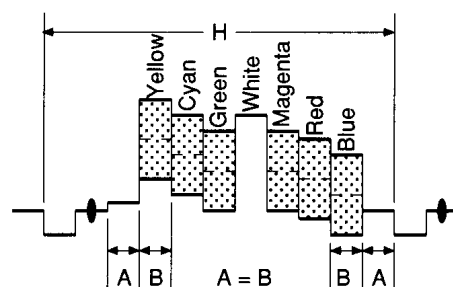


Fig. a (Video output terminal output waveform)

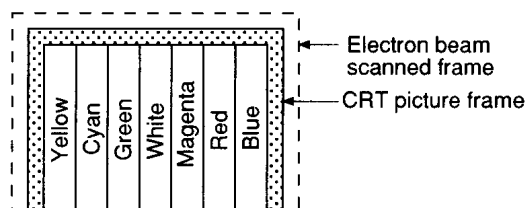
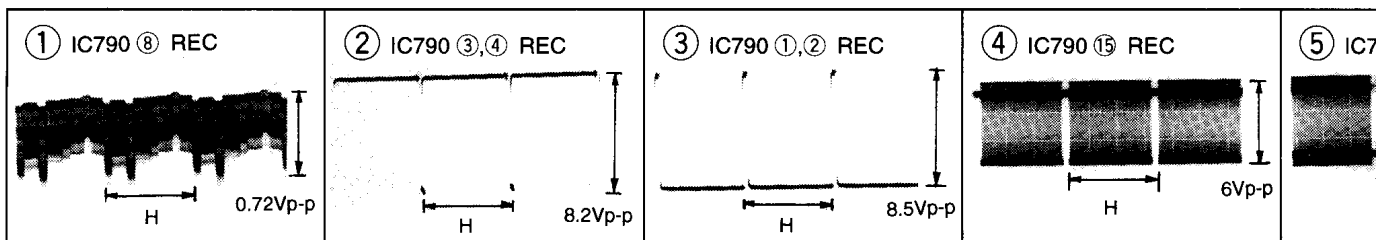


Fig. b (Picture on monitor TV)



## CD-139 BOARD

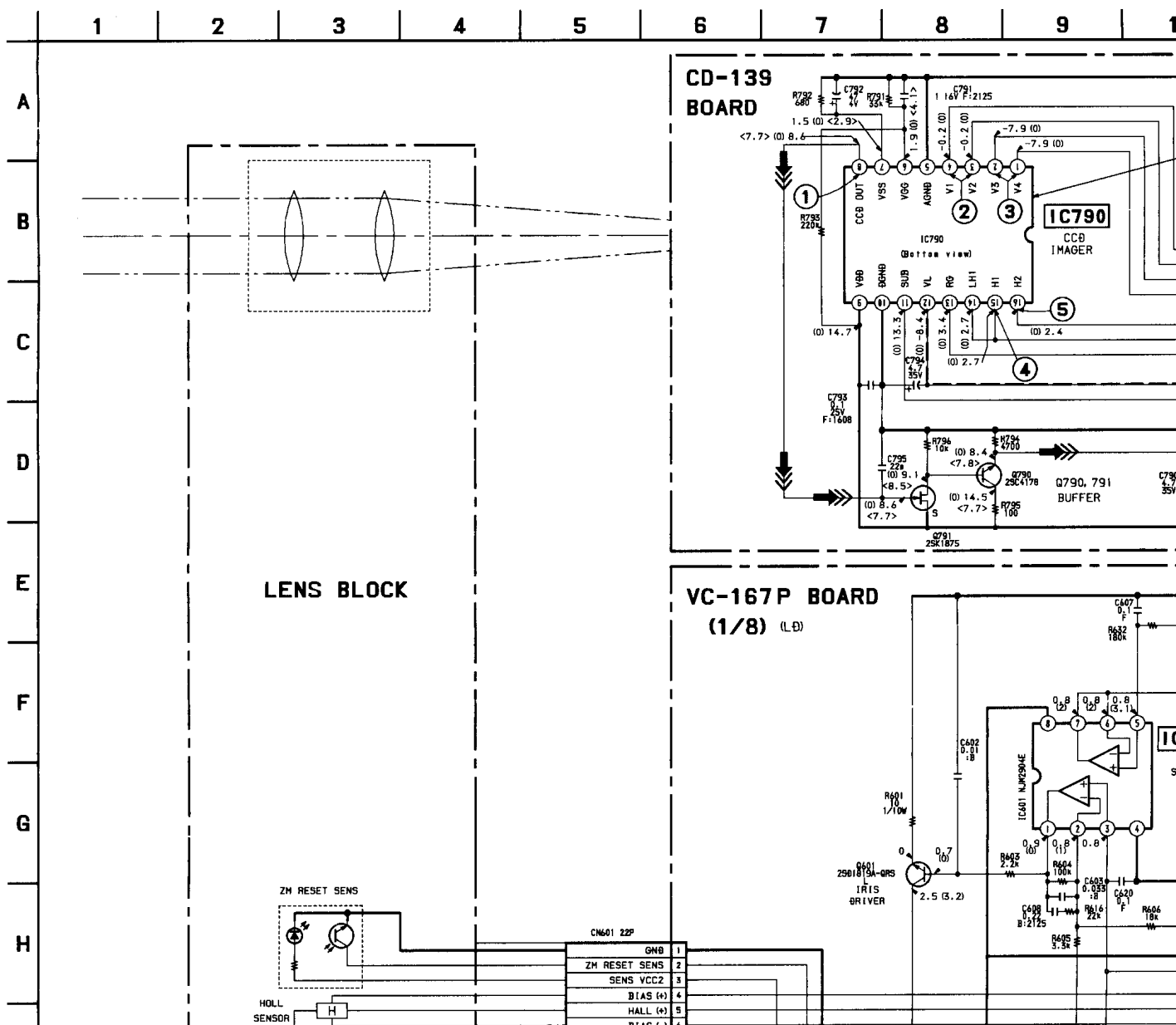


## VC-167P (CAMERA 1) , CD-139 (CCD IMAGER) SCHEMATIC DIAGRAMS

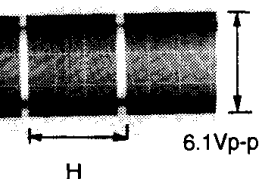
— Ref. No. VC-167P Board; 1,000 Series, CD-139 Board; 2,000 Series —

• See page 4-35 for VC-167P

• See page 4-46 for CD-139 B



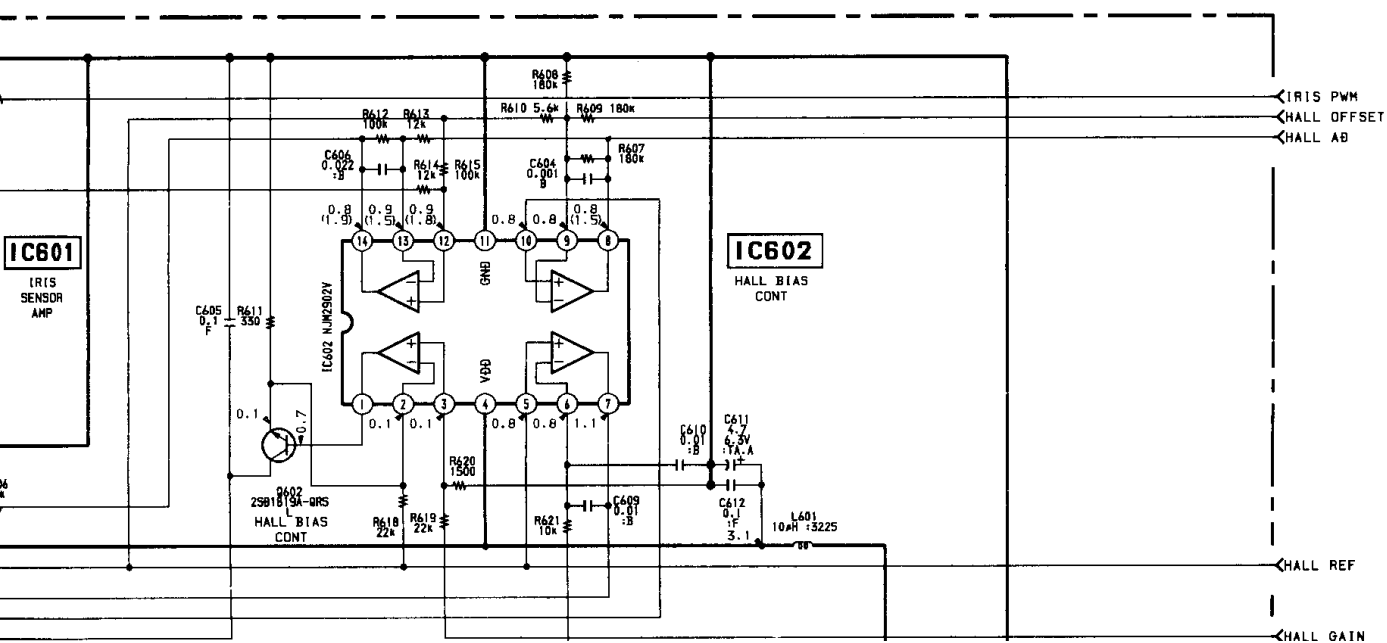
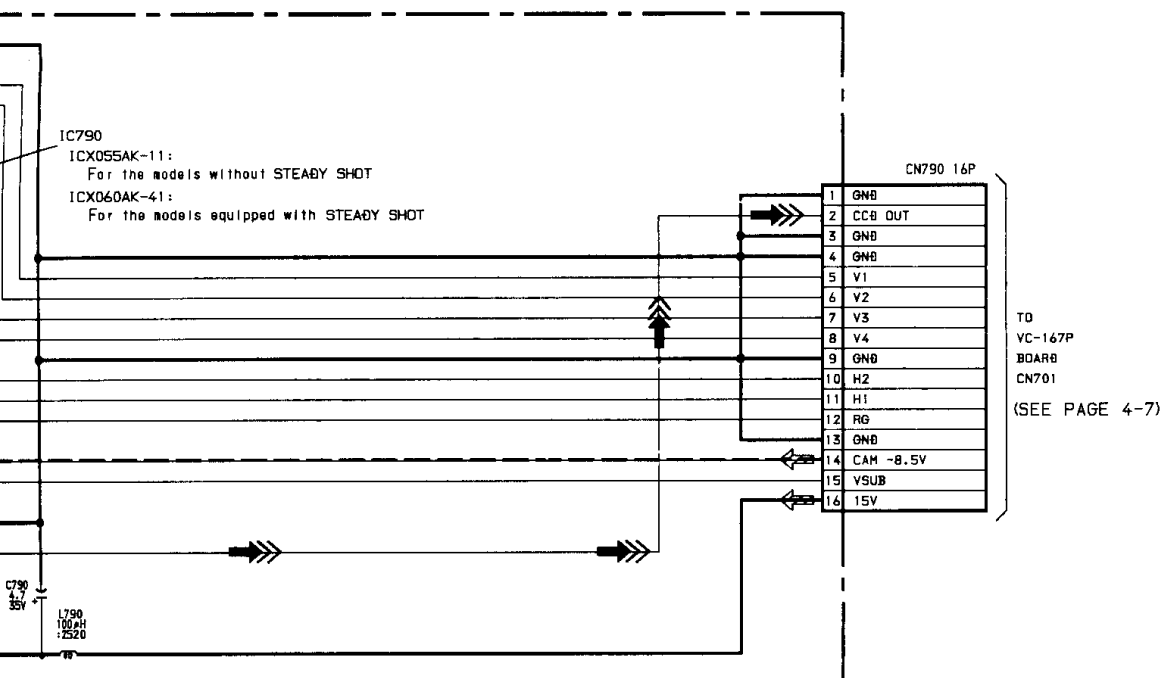
C790 16 REC



P BOARD printed wiring board.

BOARD printed wiring board.

10 11 12 13 14 15 16 17 18 19



because it is damaged by the heat.

- All resistor are in ohms, 1/4W unless otherwise noted.


Chip resistor are 1/10W unless otherwise noted.

k $\Omega$ : 1000 $\Omega$ , M $\Omega$ , : 1000k $\Omega$ .

- All capacitors are in  $\mu$ F unless otherwise noted. pF :  $\mu$   $\mu$ F. 50V or less are not indicated except for electrolytics and tantalums.

- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.


-  : nonflammable resistor.


-  : fusible resistor.

-  : panel designation.

-  : internal component.

-  : adjustment for repair. \*

-  : B+ Line. \*

-  : B- Line. \*



-  : IN/OUT direction of (+, -) B LINE. \*

- Circled numbers refer to waveforms. \*

- Signal name

\*E/-L→E/L      \*—VAPB→VAPB

—EDIT→EDIT      \*VAPB→VAPB

**NOTE:** The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- \* : indicated by the color red.

Lens reference plane  
surface Imager surface  
of CCD imager  
(IC790 on CD-139 board)

2. Adjust the distance so that the output waveform of Fig. a and the Fig. b can be obtain.

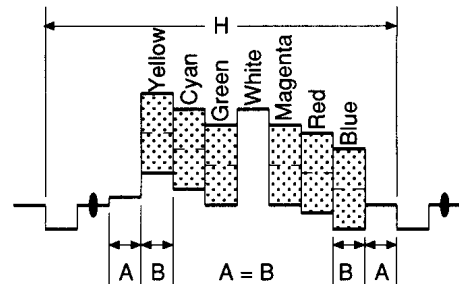


Fig. a (Video output terminal output waveform)

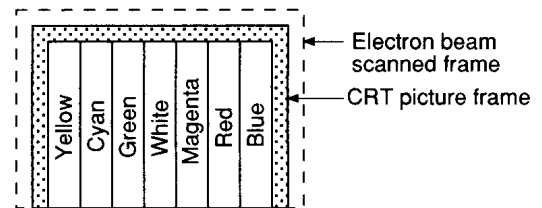
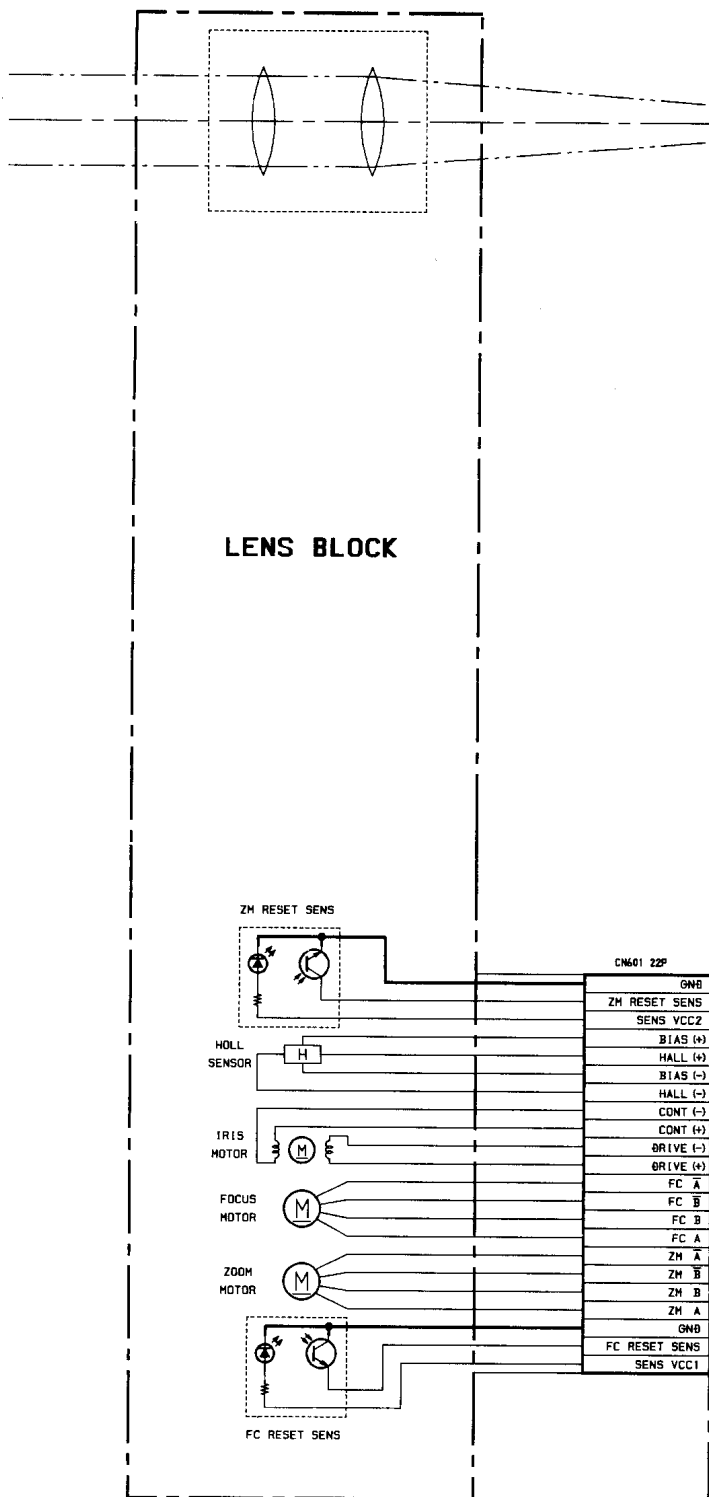


Fig. b (Picture on monitor TV)

## Precautions Upon Replacing CCD Imager

- The CD-139 board mounted as a repair part is not equipped with a CCD imager.  
When replacing this board, remove the CCD imager from the old one and mount it onto the new one.
- If the CCD imager has been replaced, carry out all the adjustments for the camera section.
- As the CCD imager may be damaged by static electricity from its structure, handle it carefully like for the MOS IC. In addition, ensure that the receiver is not covered with dusts nor exposed to strong light.

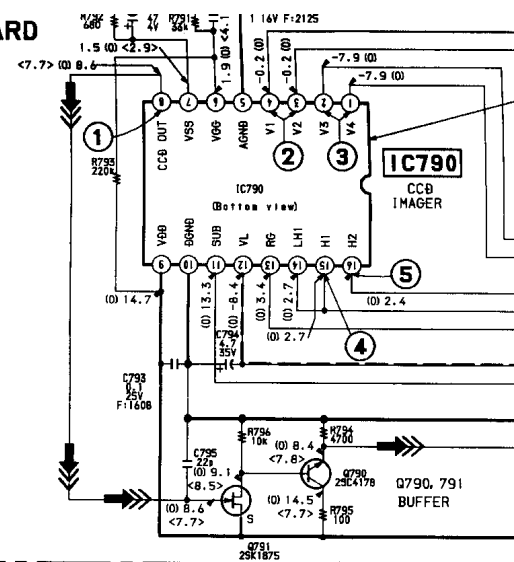


no mark: REC or REC/PB  
 ( ): PB  
 <> : REC (X24 MODEL)

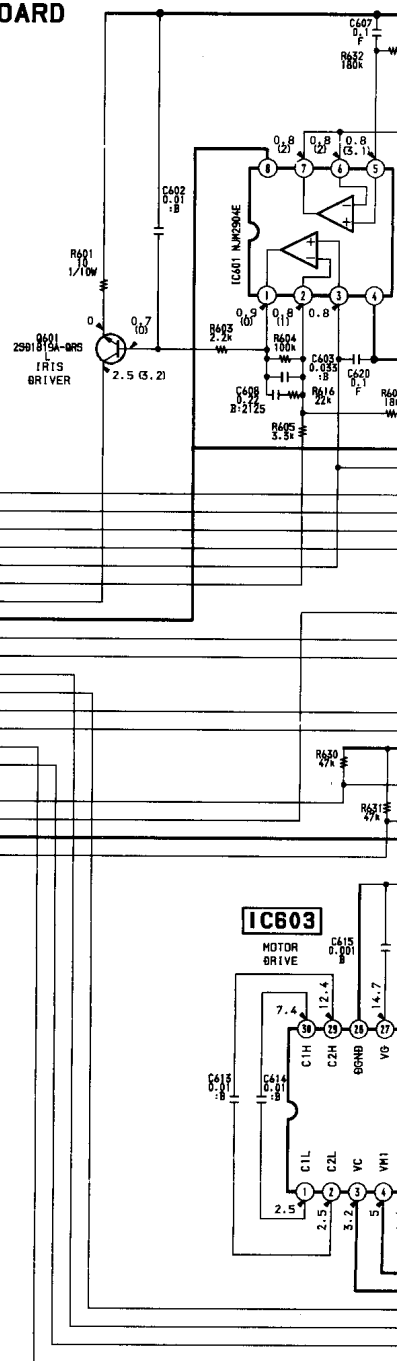
**SIGNAL PATH**

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC			➡➡➡	
PB				

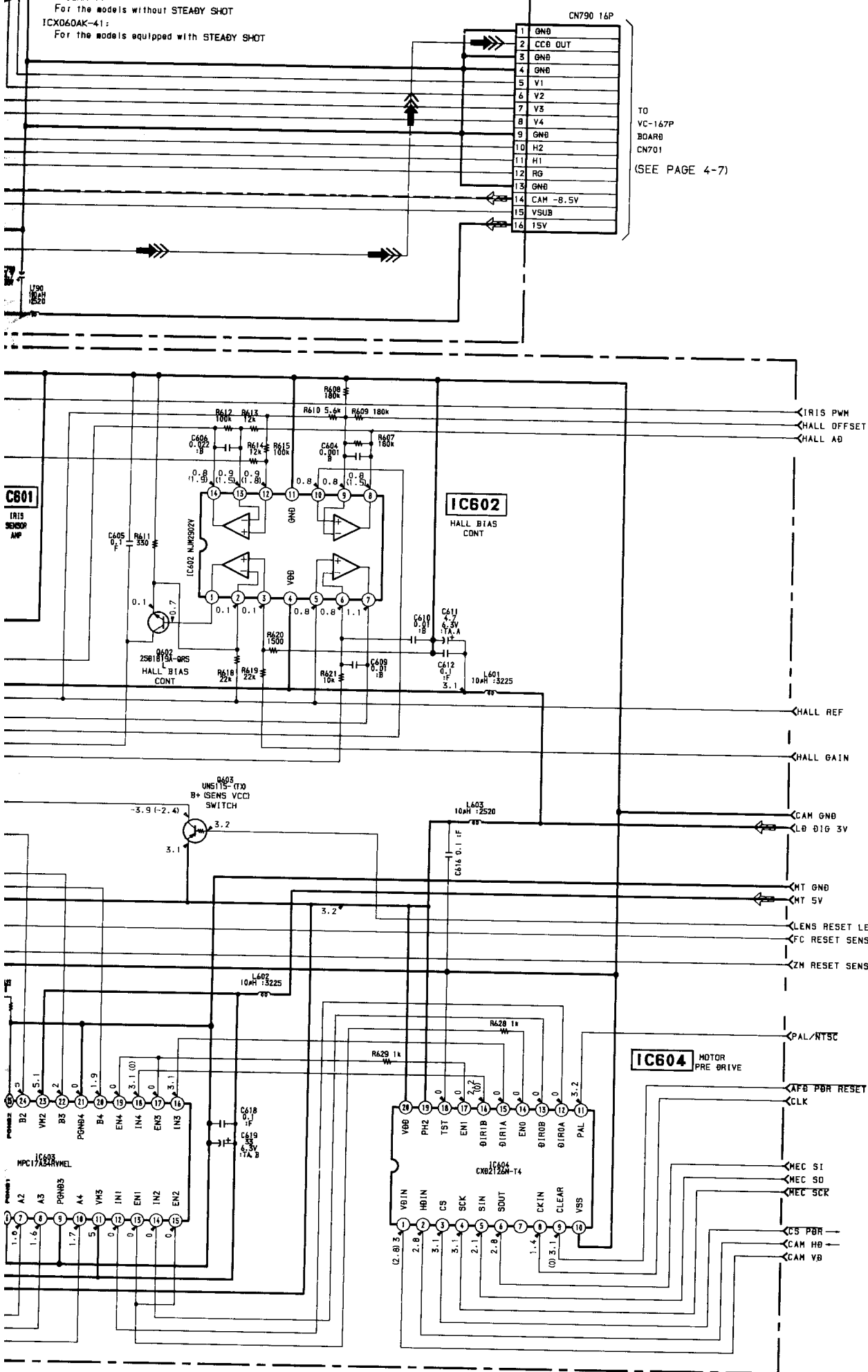
**BOARD**



**VC-167P BOARD (1/8) (L.D.)**



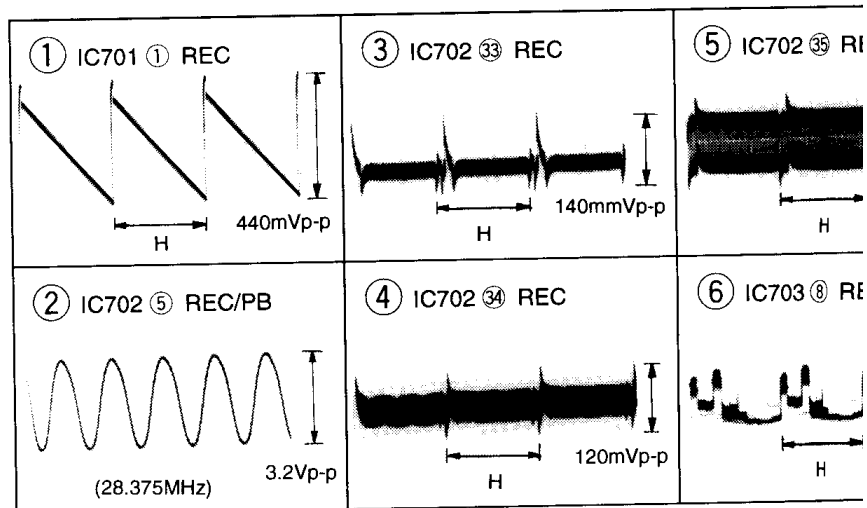
ICX060AK-41:  
For the models equipped with STEADY SHOT



TO  
VC-167P  
BOARD  
CN701  
(SEE PAGE 4-7)

TO (2/8) (1)  
(SEE PAGE 4-7)

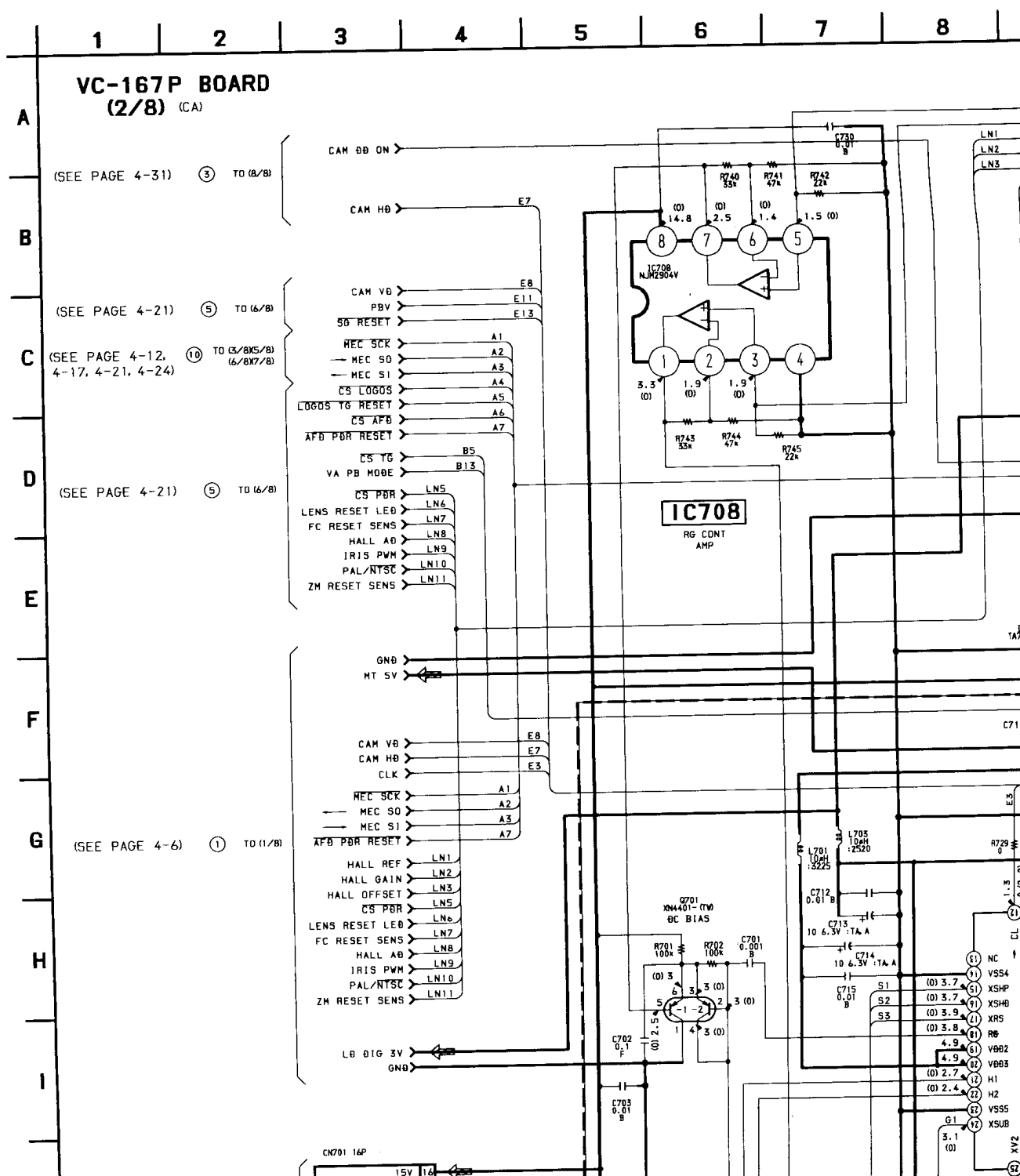
## VC-167P BOARD

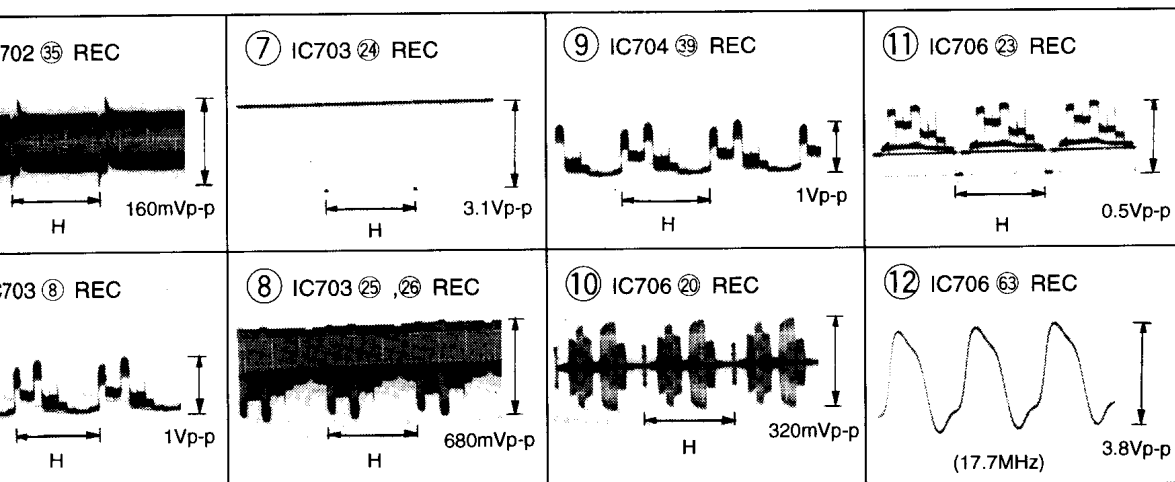


### VC-167P (CAMERA 2) SCHEMATIC DIAGRAM

- See page 4-35 for VC-167P BOA

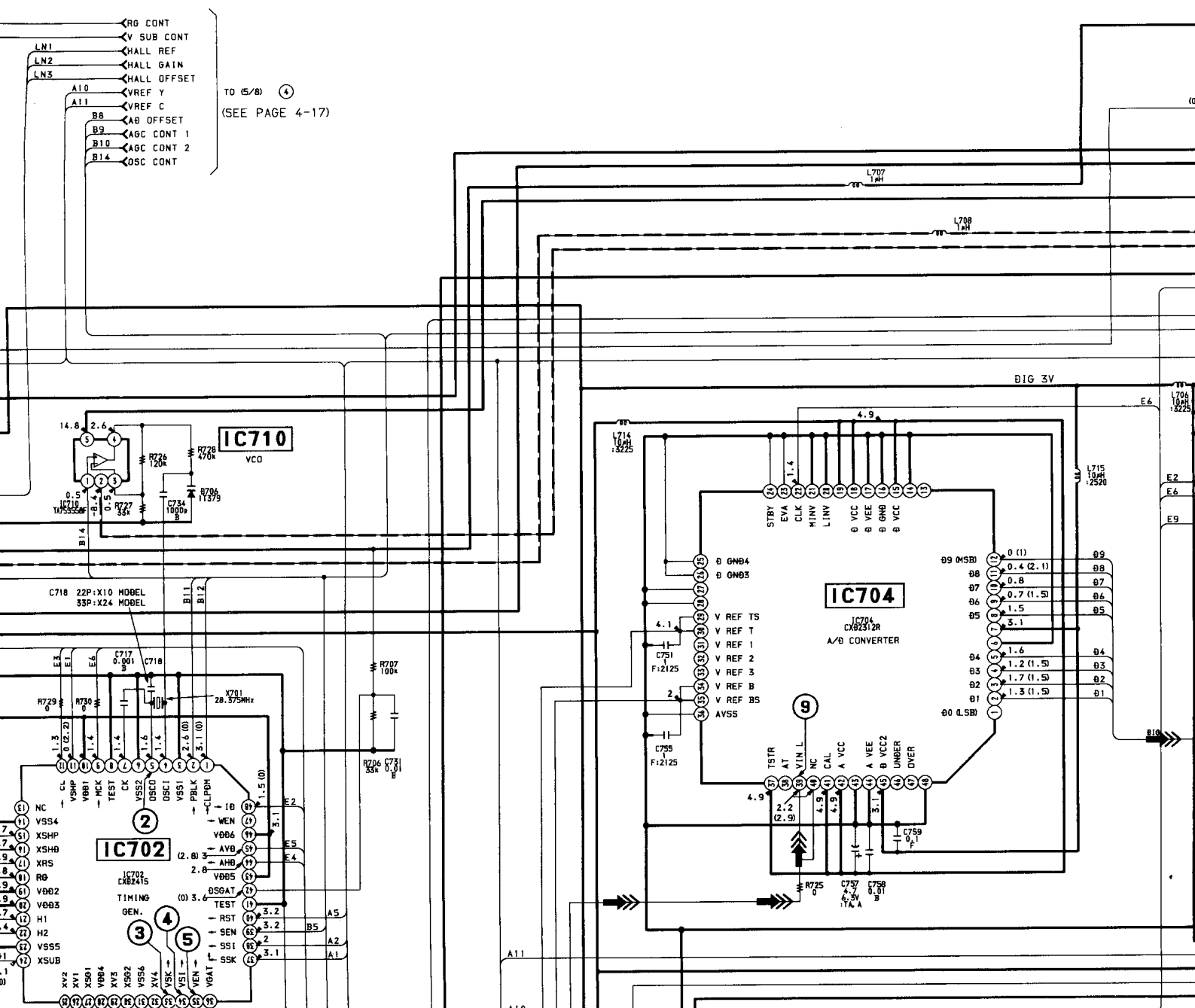
— Ref. No. VC-167P Board; 1,000 Series —

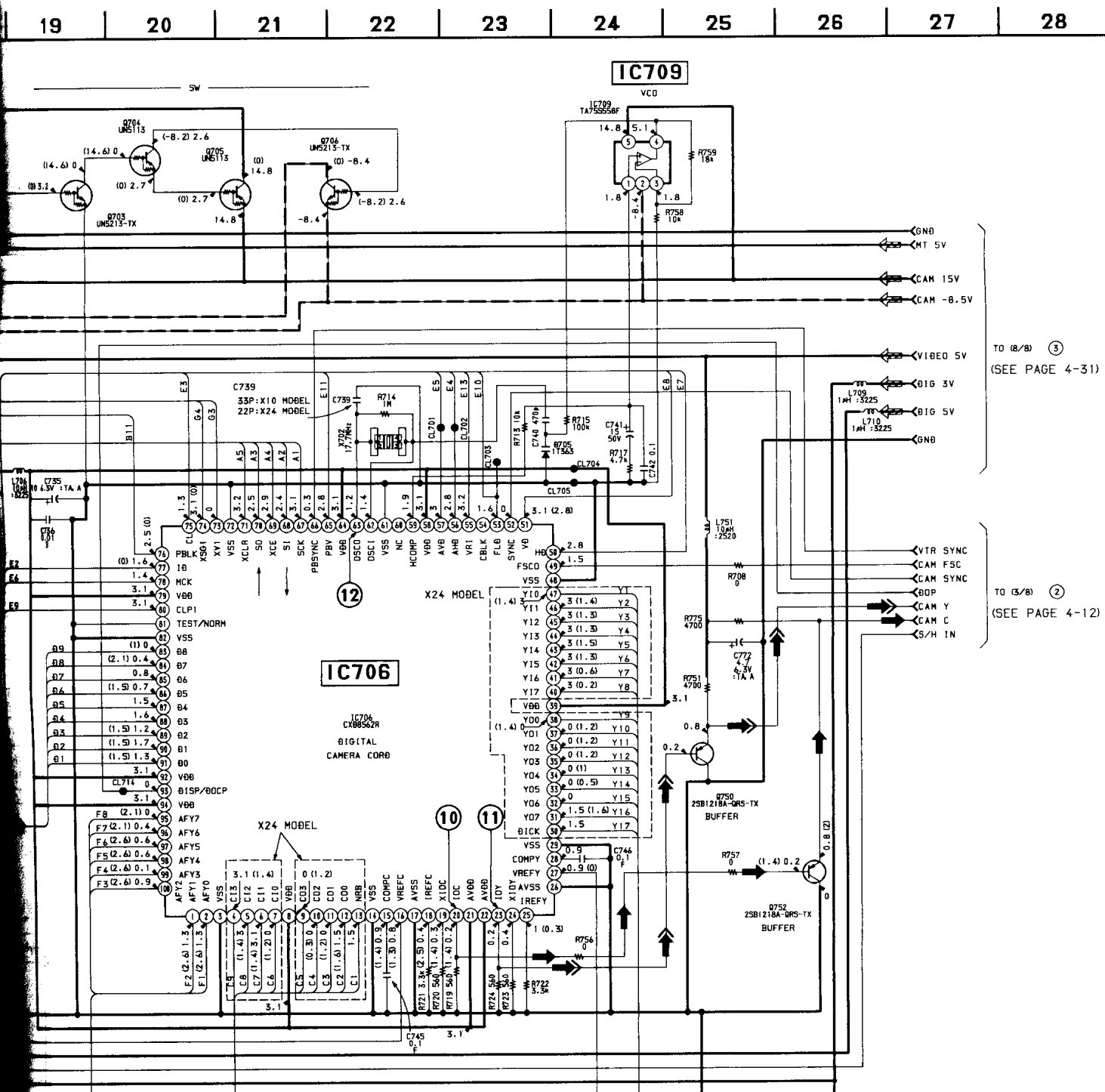




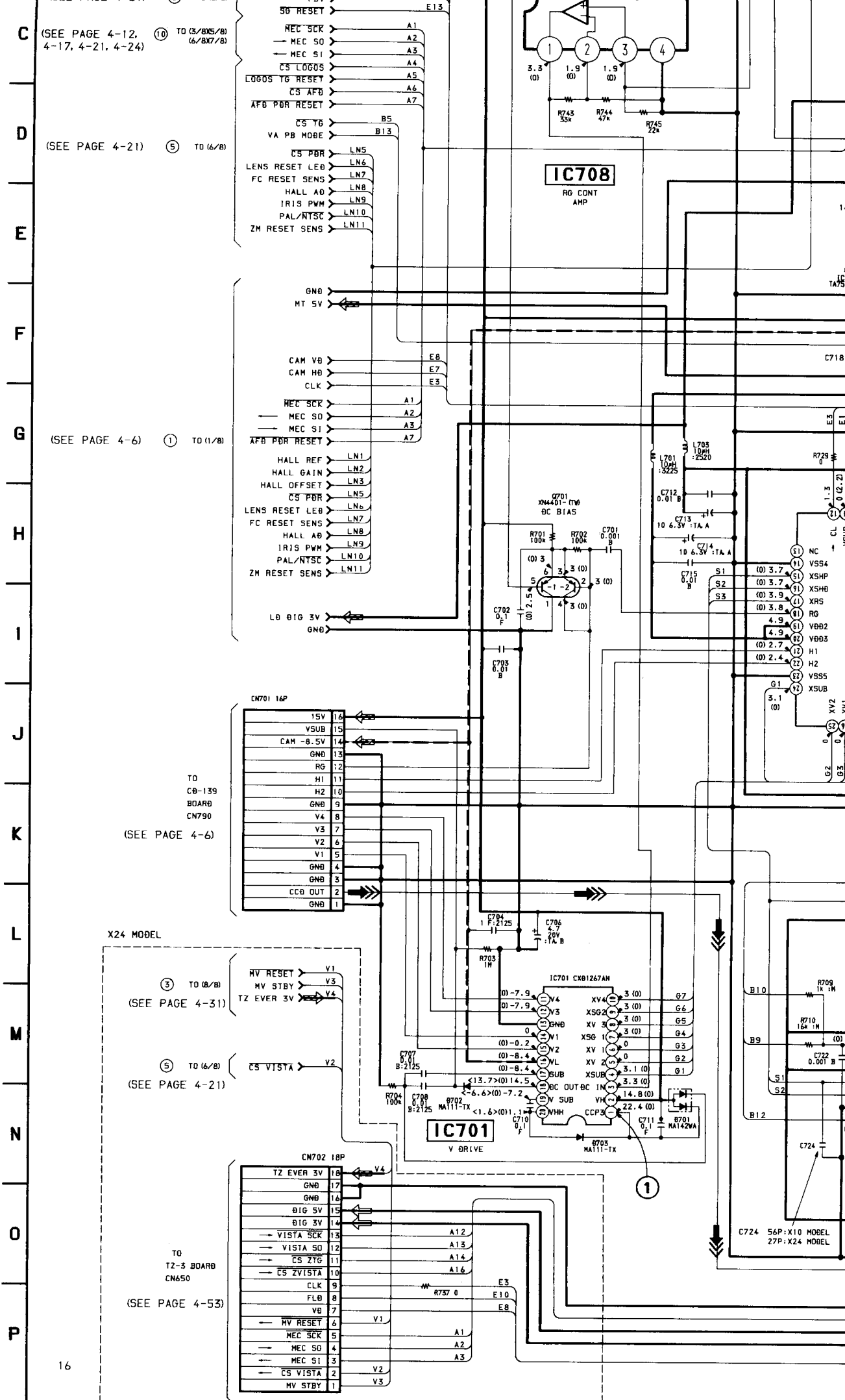
167P BOARD printed wiring board.

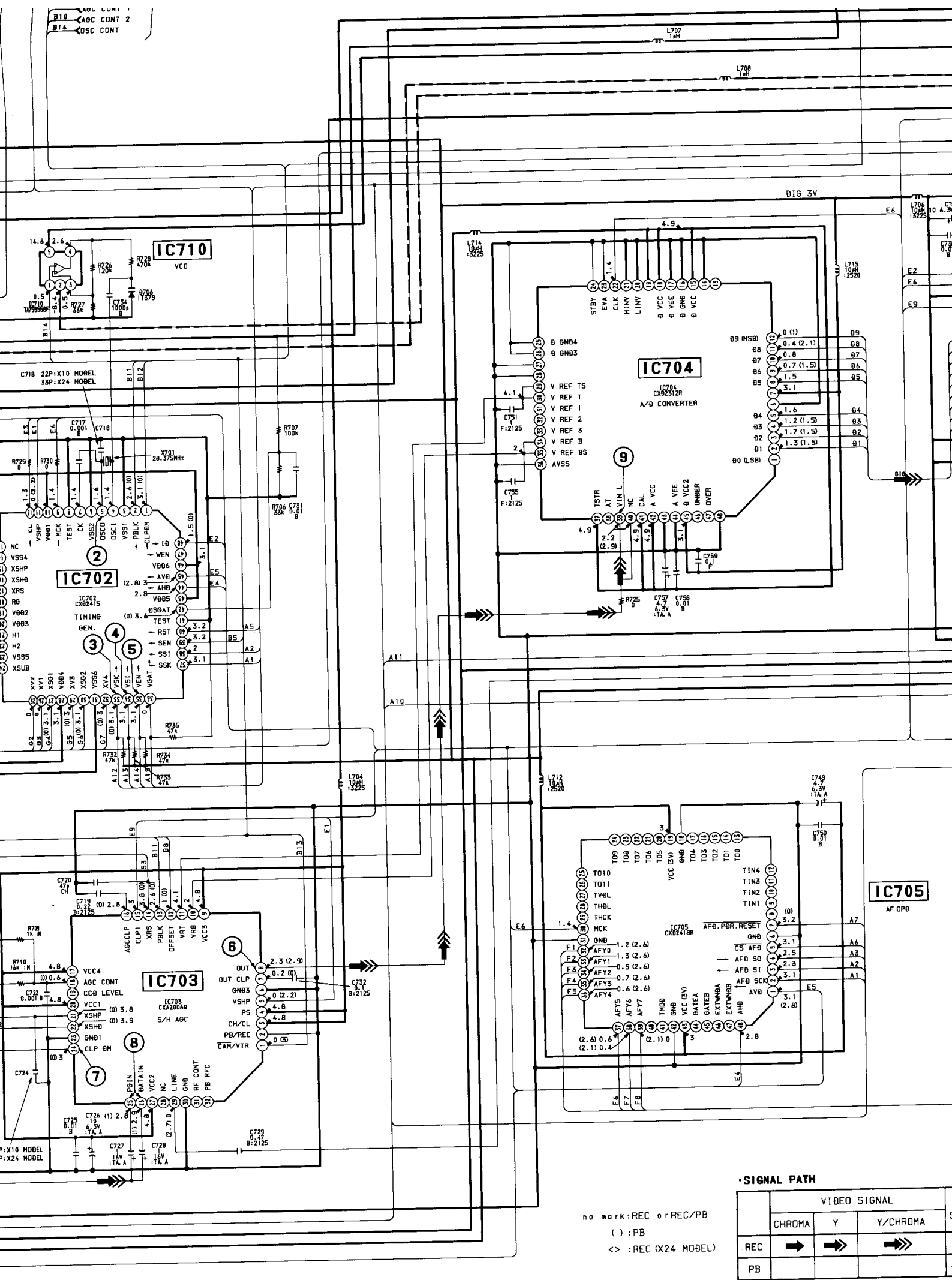
8 9 10 11 12 13 14 15 16 17 18

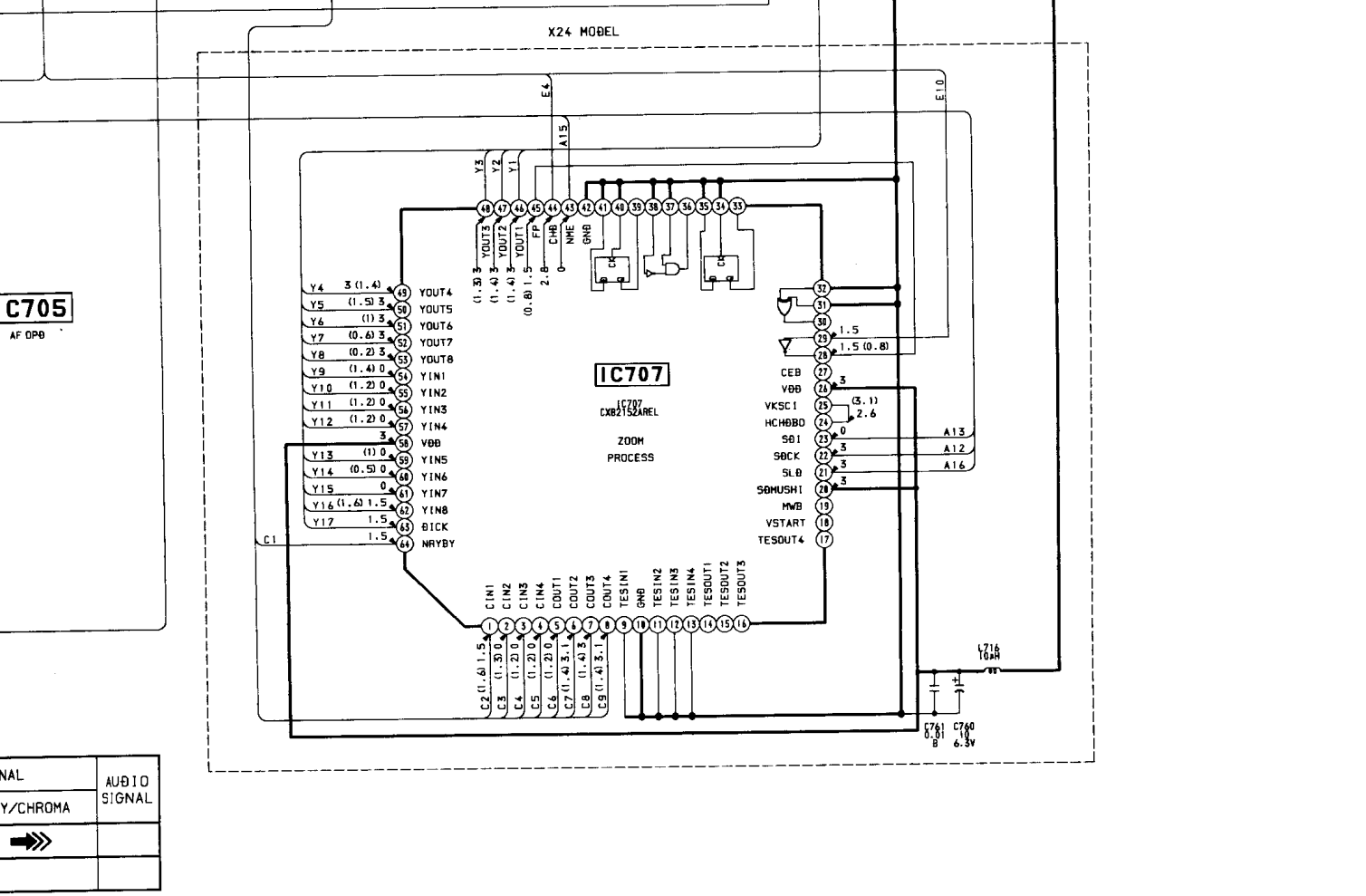
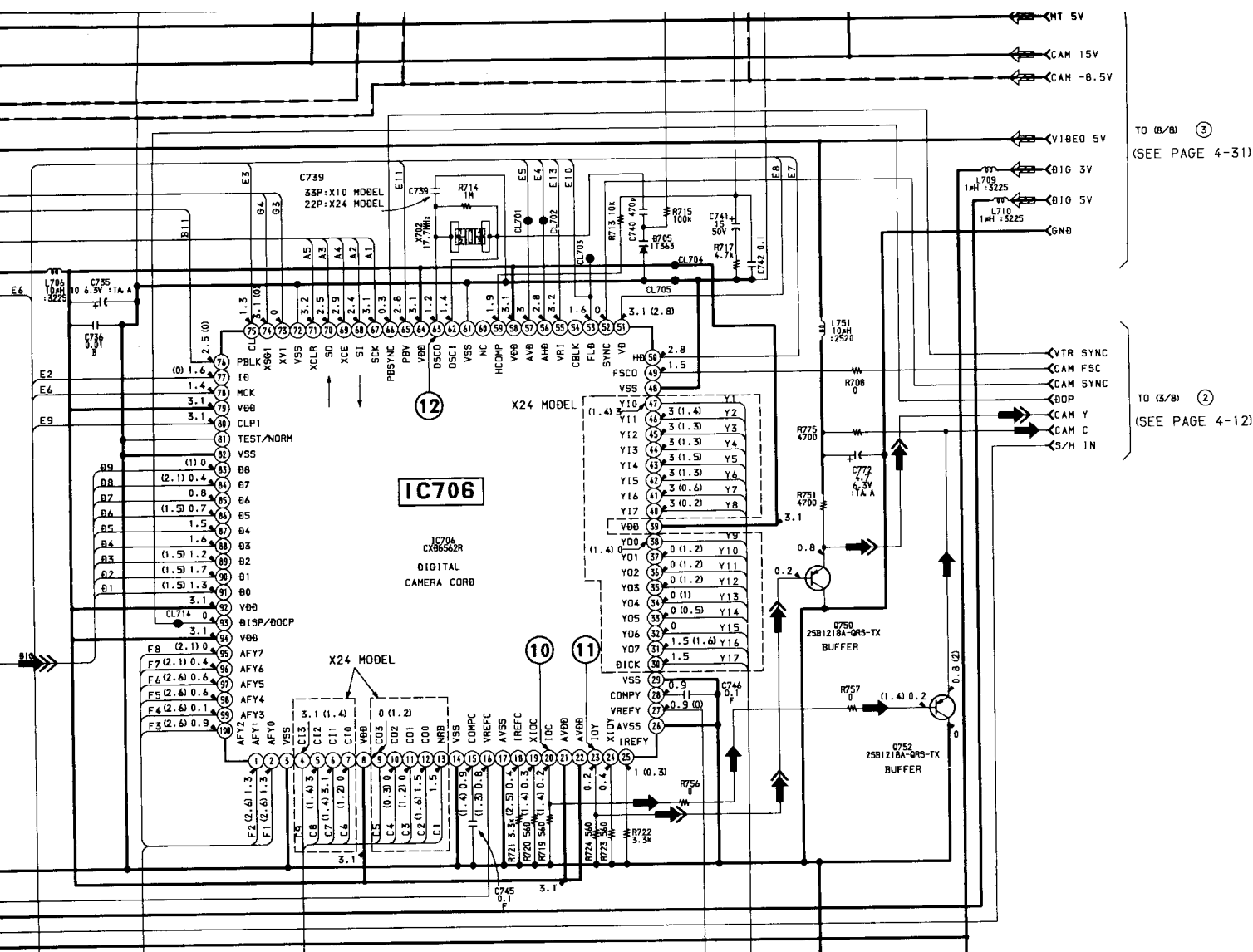




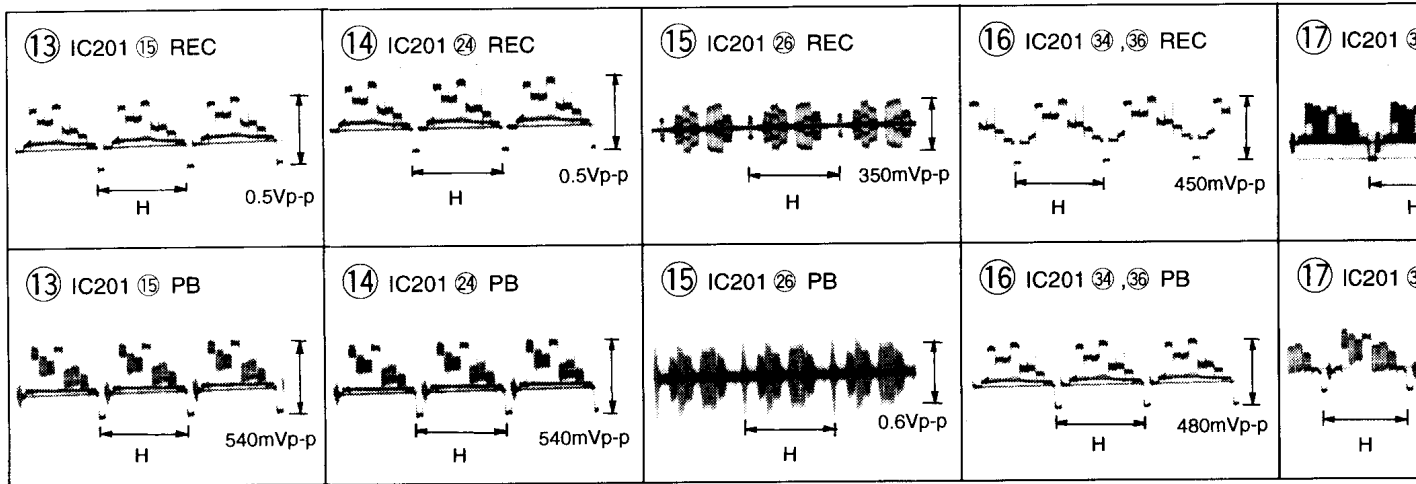








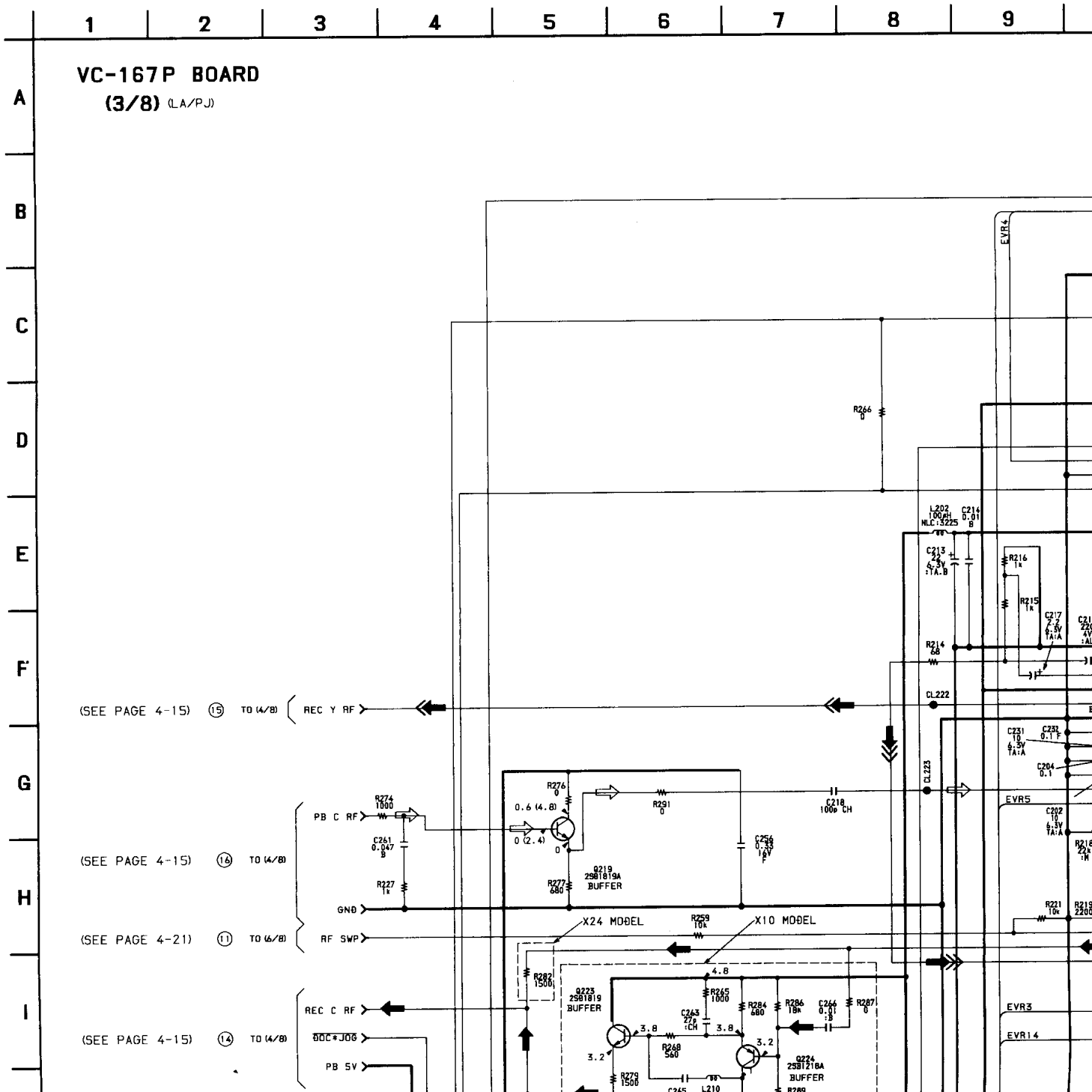
## VC-167P BOARD

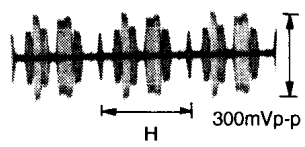
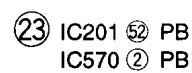
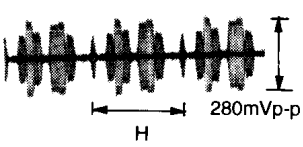
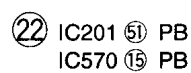
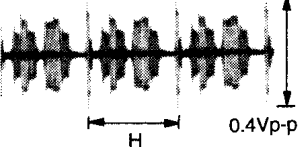
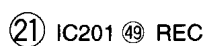
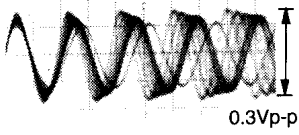
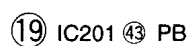
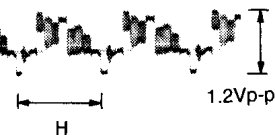
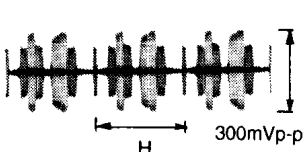
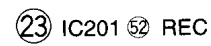
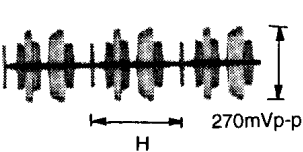
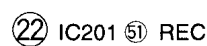
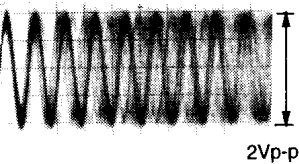
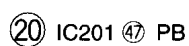
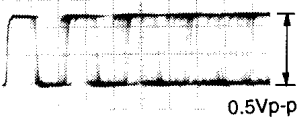
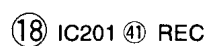
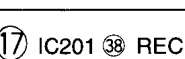


### VC-167P (CAMERA 3) SCHEMATIC DIAGRAM

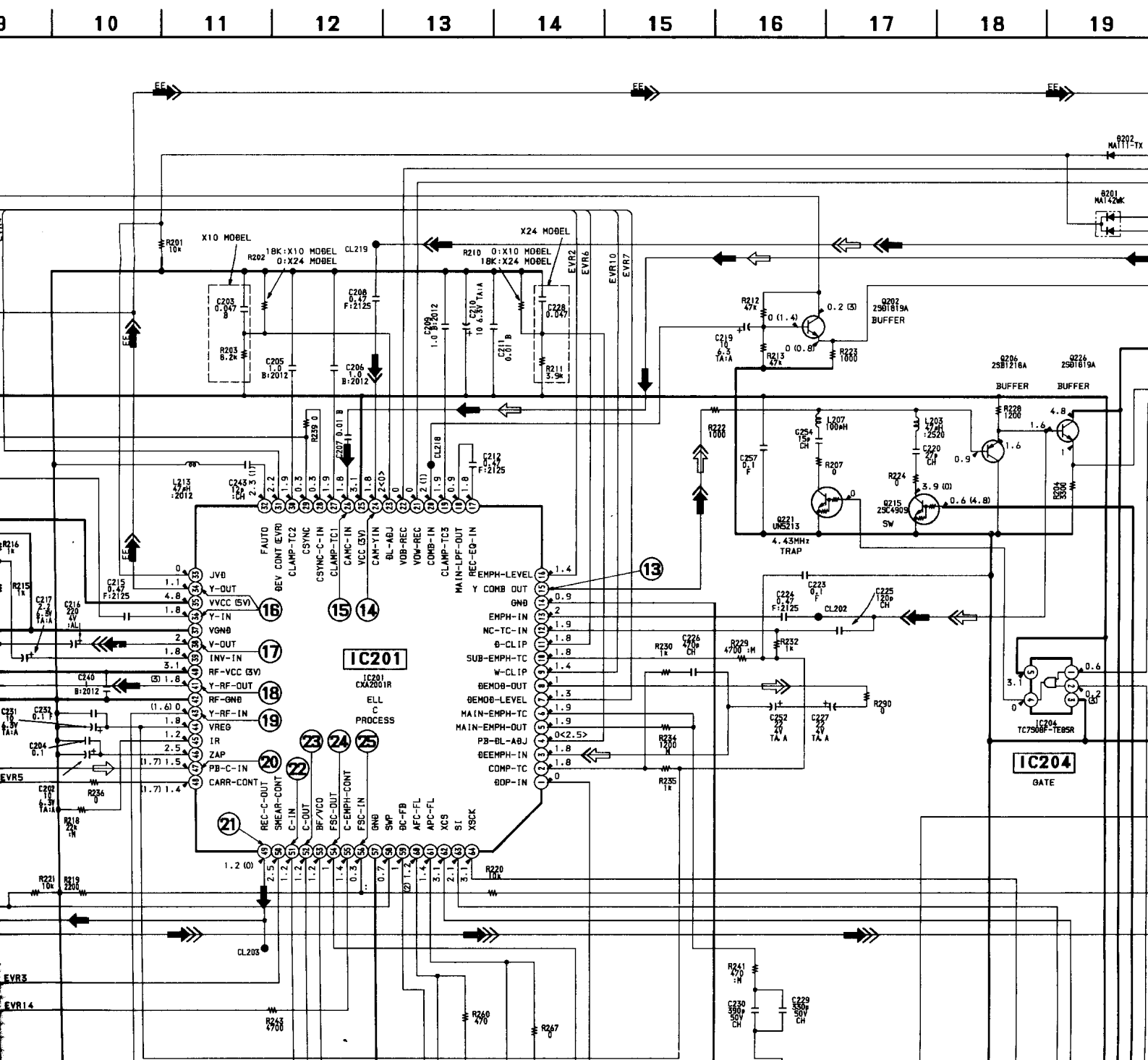
- See page 4-35 for VC-167P BOARD printed wiring board.

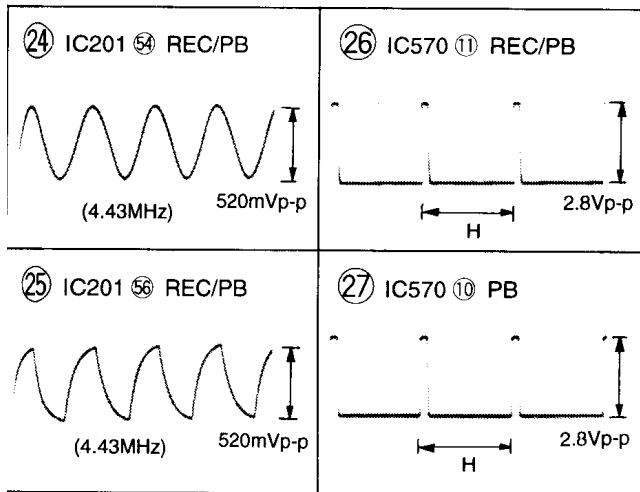
— Ref. No. VC-167P Board; 1,000 Series —



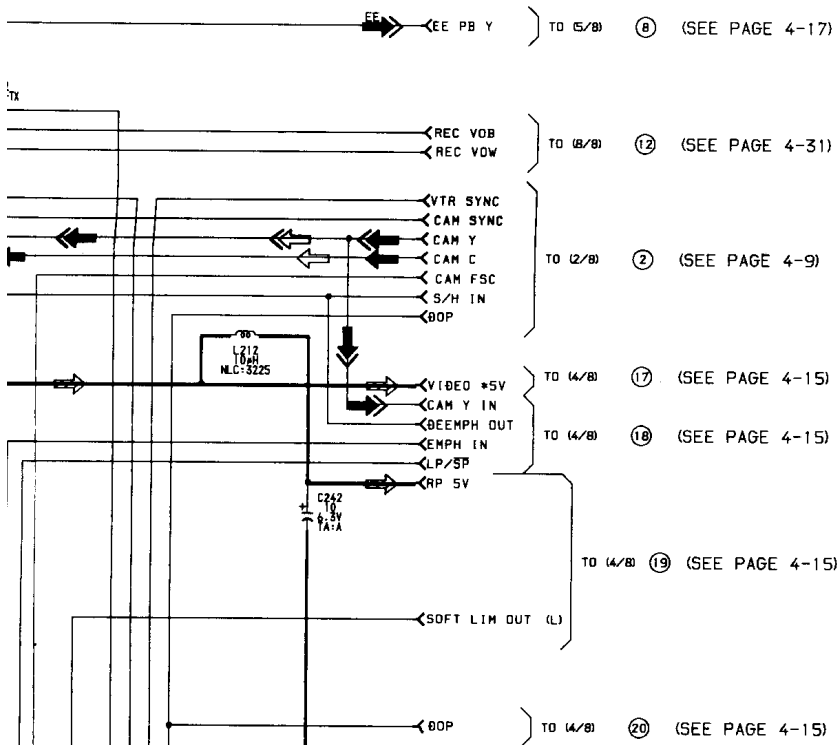


ng board.





20	21	22	23	24
----	----	----	----	----

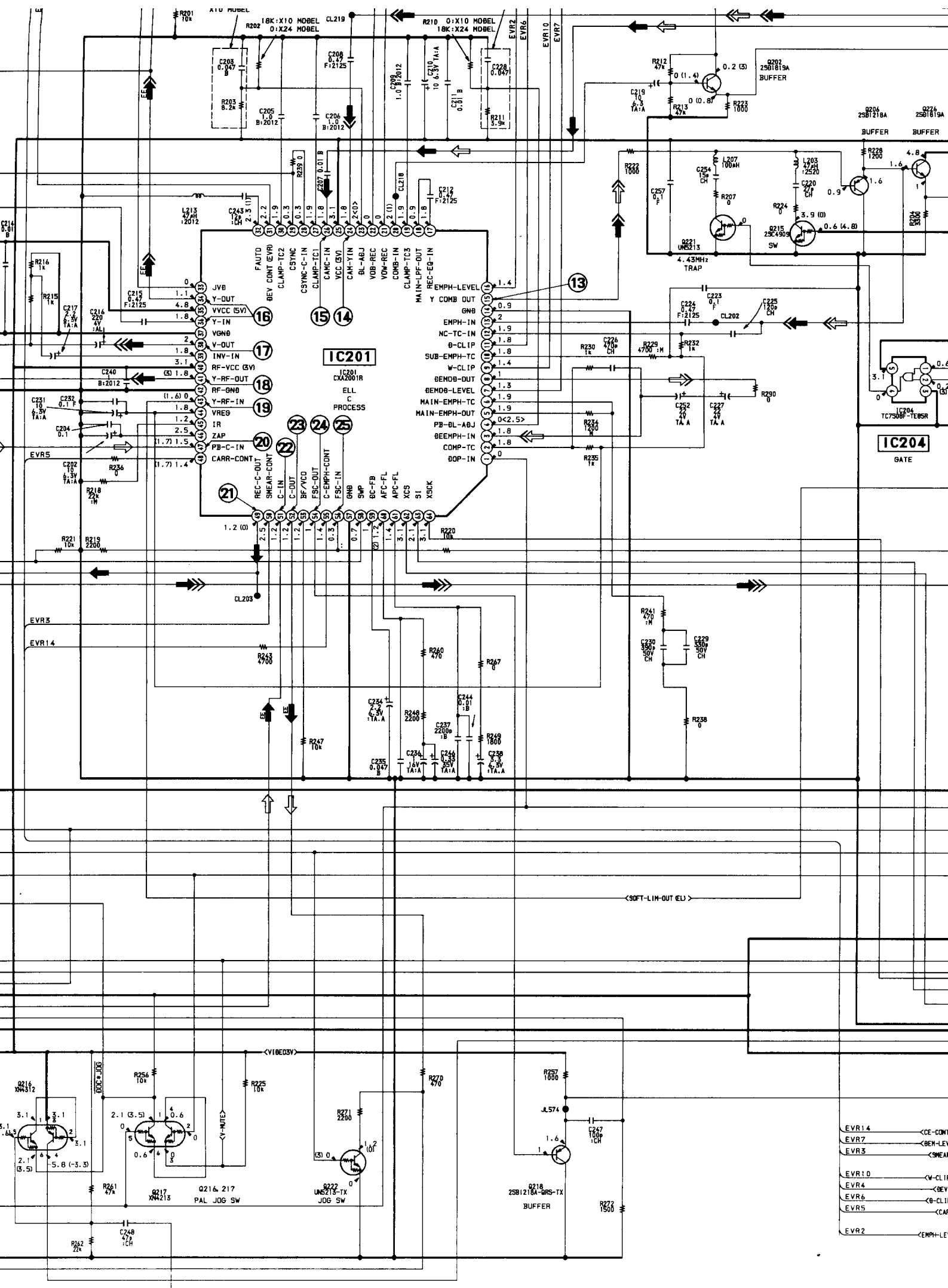


no mark: REC or REC/PB  
 ( ) : PB  
 < > : REC (X24 MODEL)

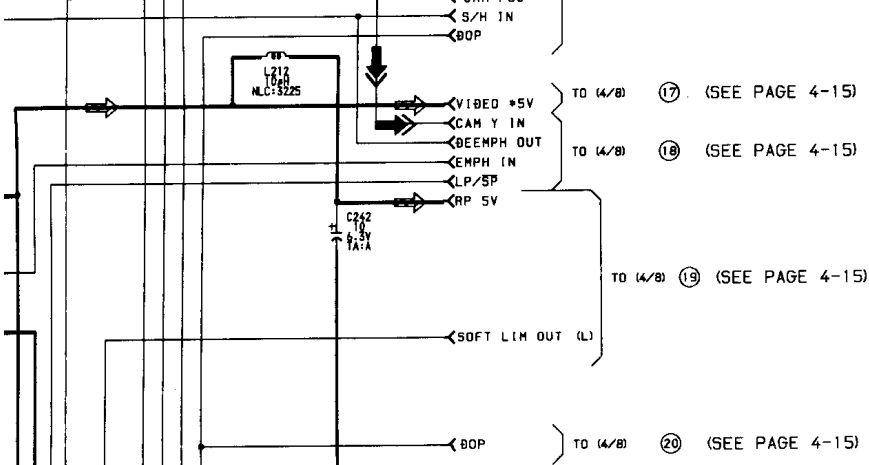
#### -SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡➡	➡➡➡	
PB	⇨	⇨➡	⇨➡➡	

**P**



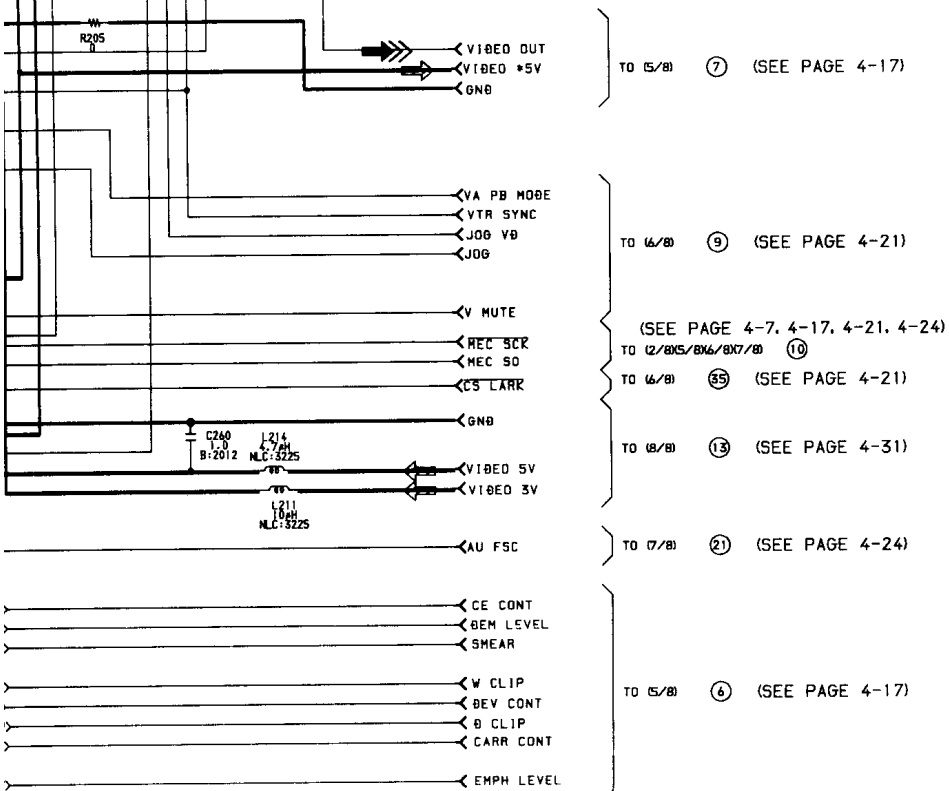




no mark: REC or REC/PB  
 ( ) : PB  
 < > : REC (X24 MODEL)

#### SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡➡	
PB	➡	➡	➡➡	

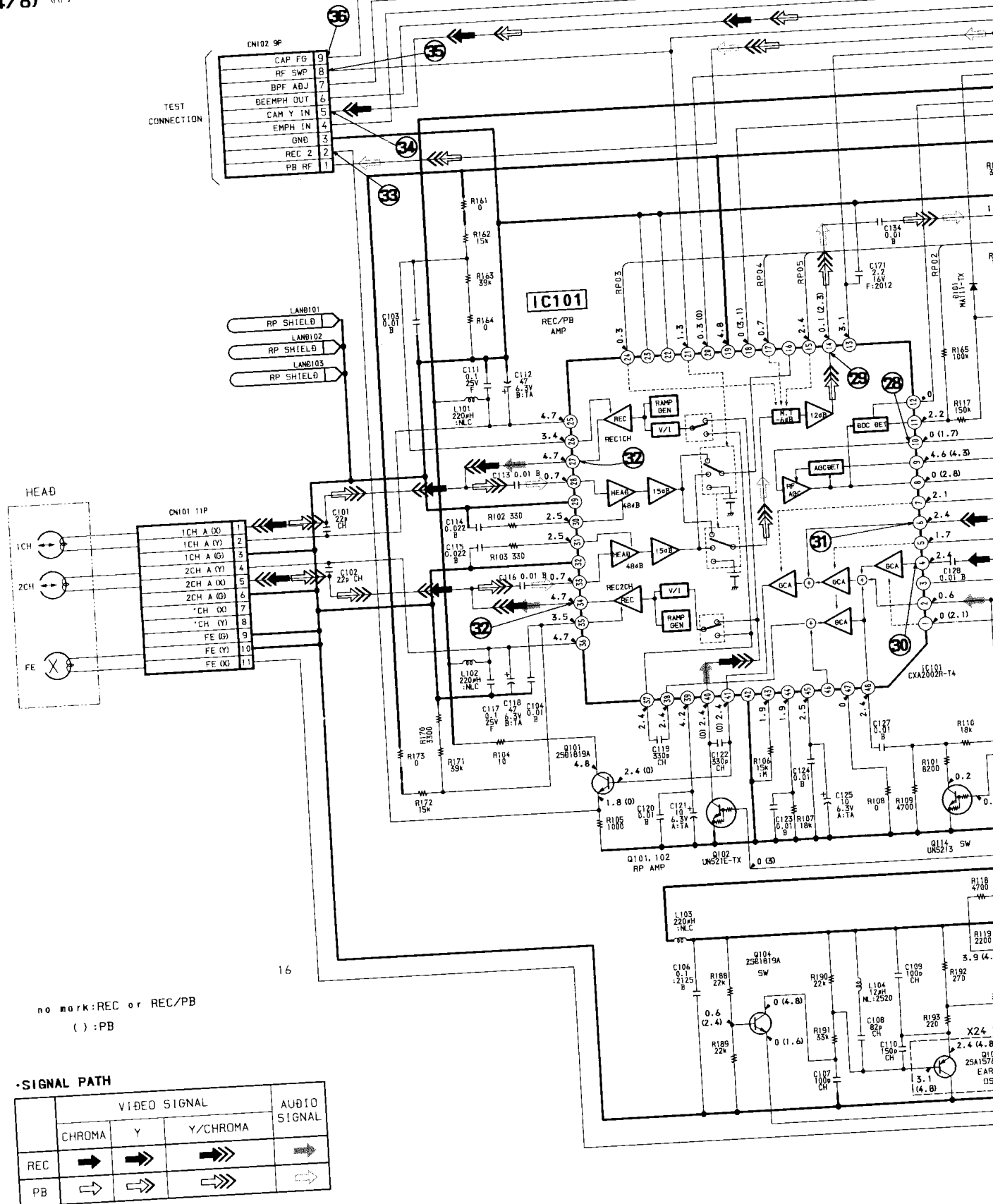


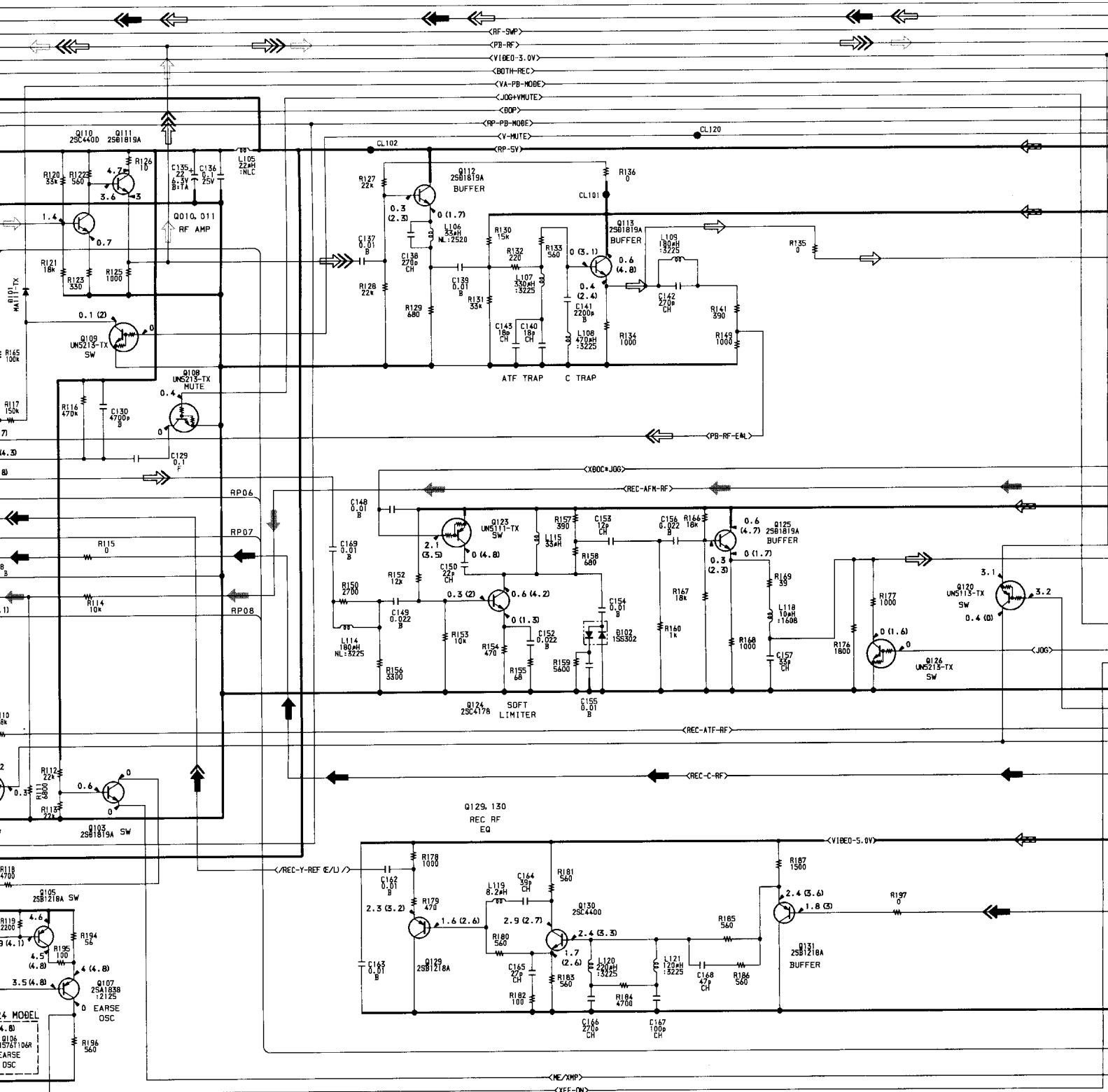
# C-167P (VIDEO 1) SCHEMATIC DIAGRAM

Ref. No. VC-167P Board; 1,000 Series —

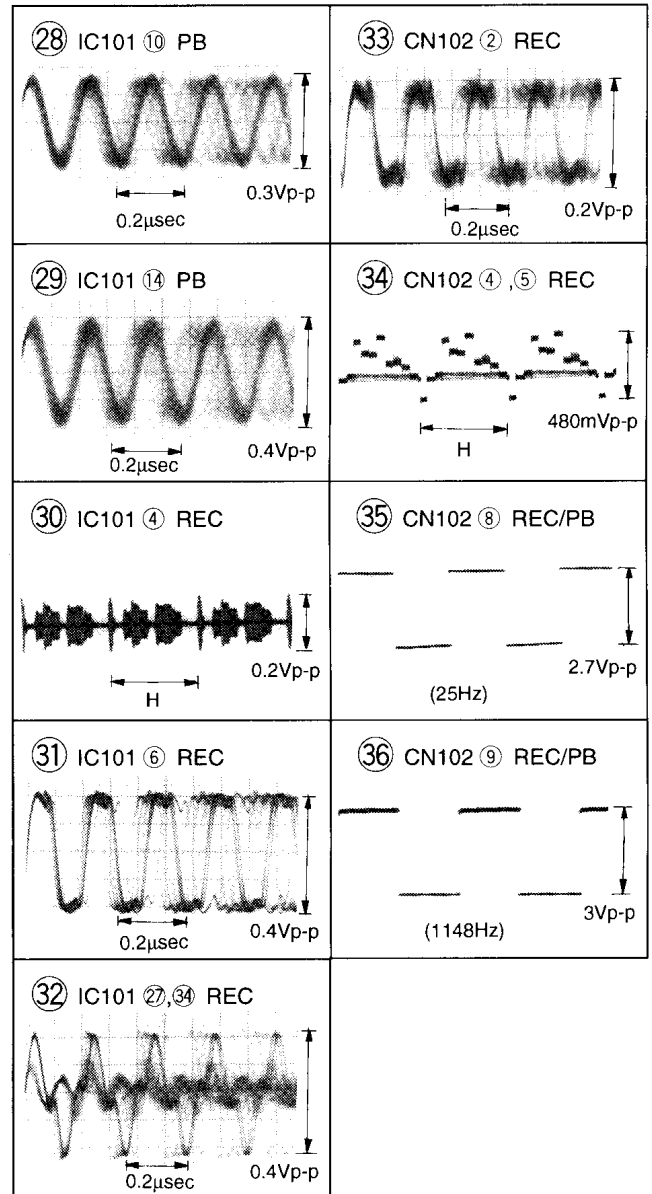
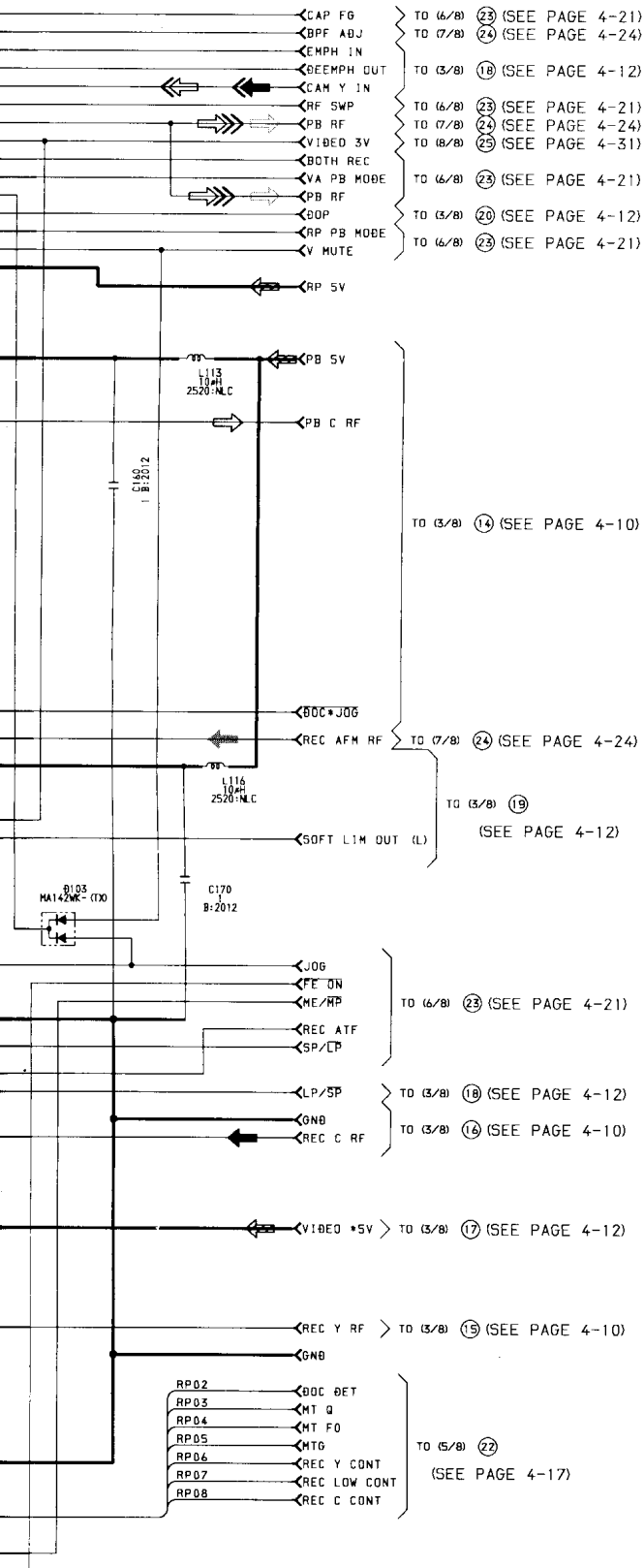
• See page 4-35 for VC-167P BOARD printed wiring board.

## VC-167P BOARD (4/8) (RP)



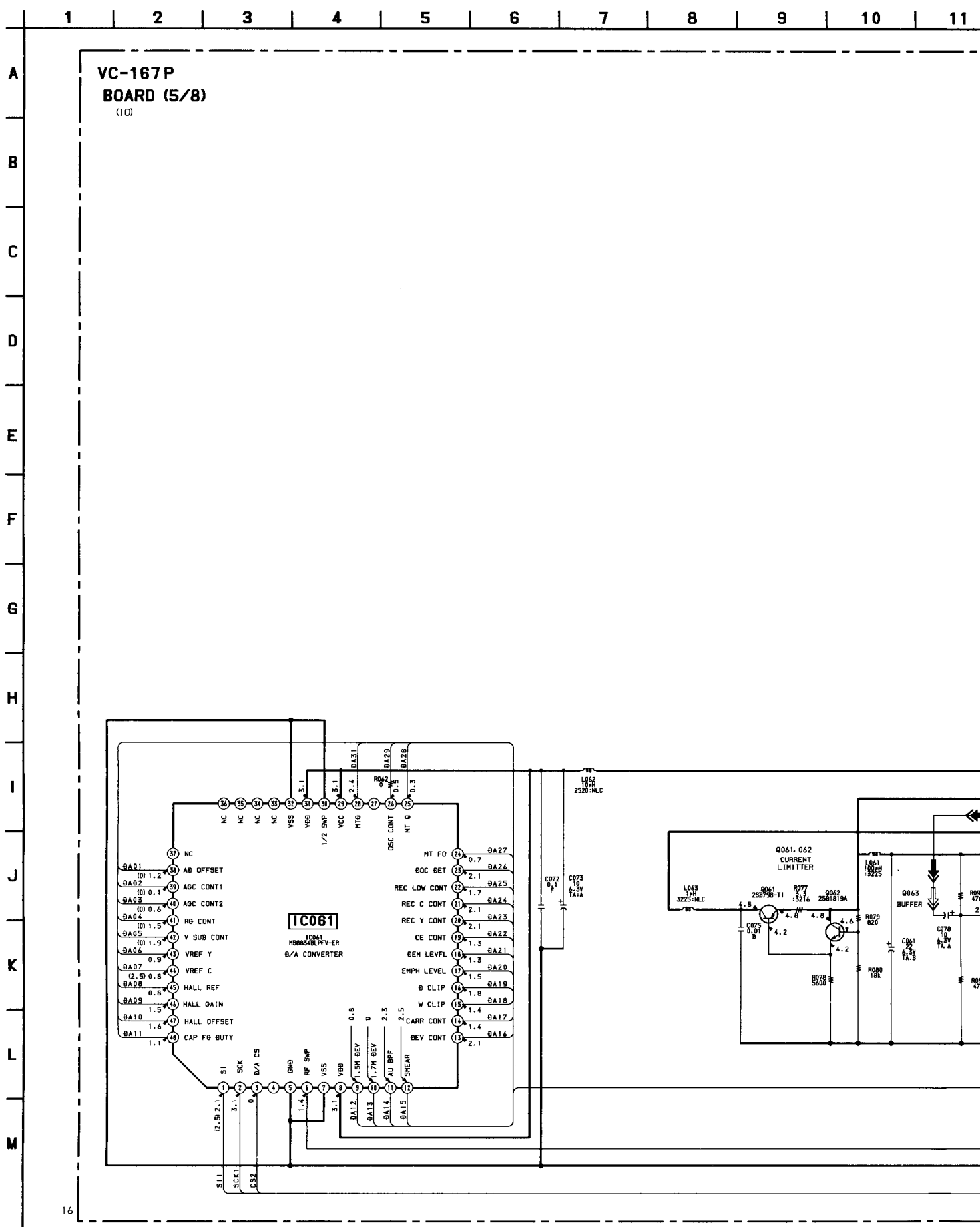


# VC-167P BOARD

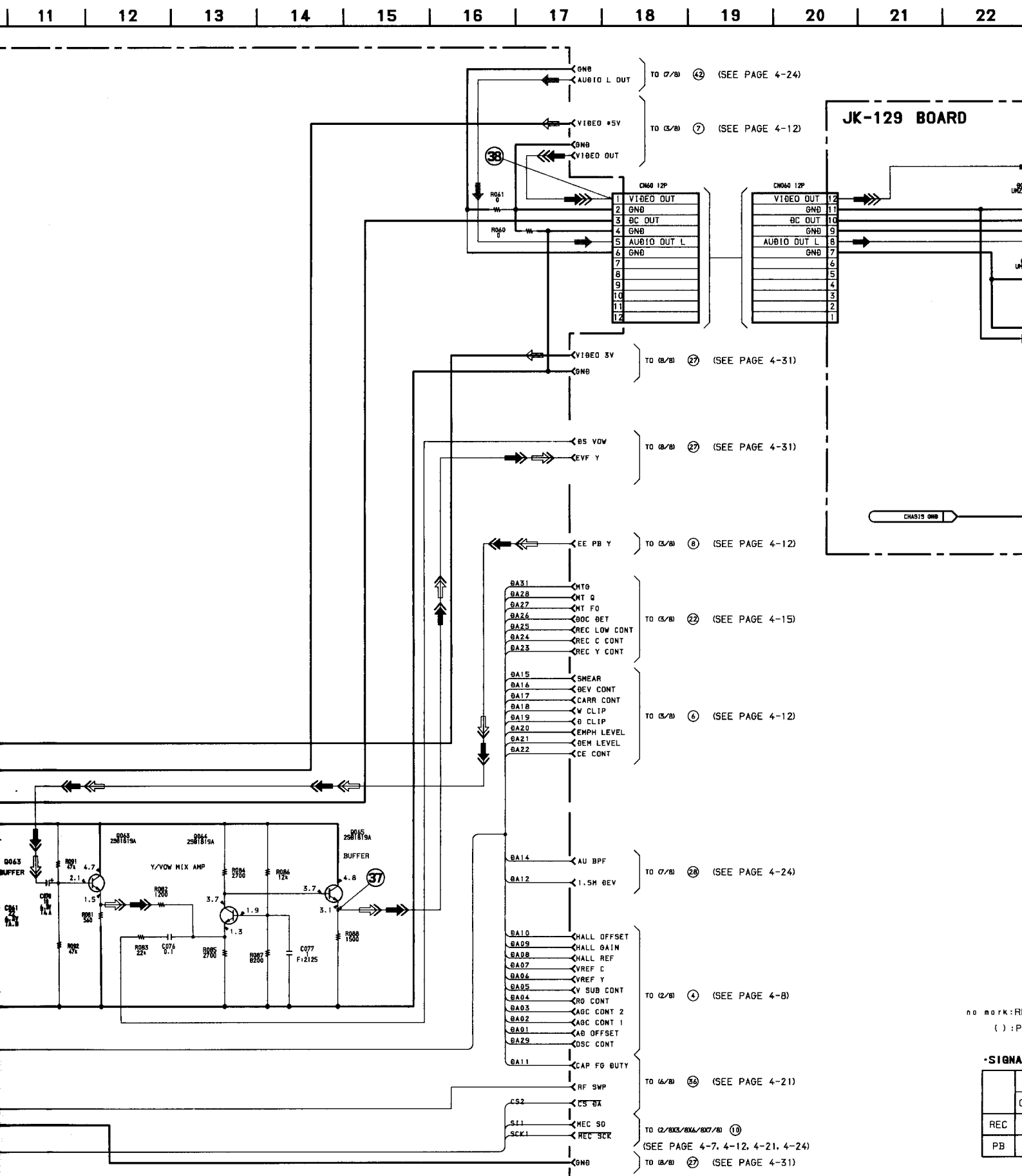


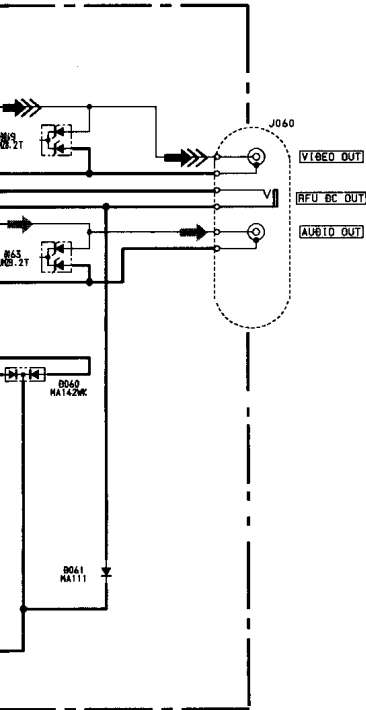
— Ref. No. VC-167P Board; 1,000 Series, JK-129 Board; 2,000 Series —

- See page 4-35 for VC-167P BOARD printed wiring board
- See page 4-46 for JK-129 BOARD printed wiring board

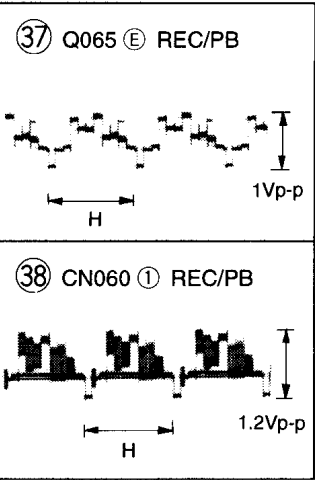


wiring board.  
wiring board.





# VC-167P BOARD



REC or REC/PB  
PB

## AL PATH

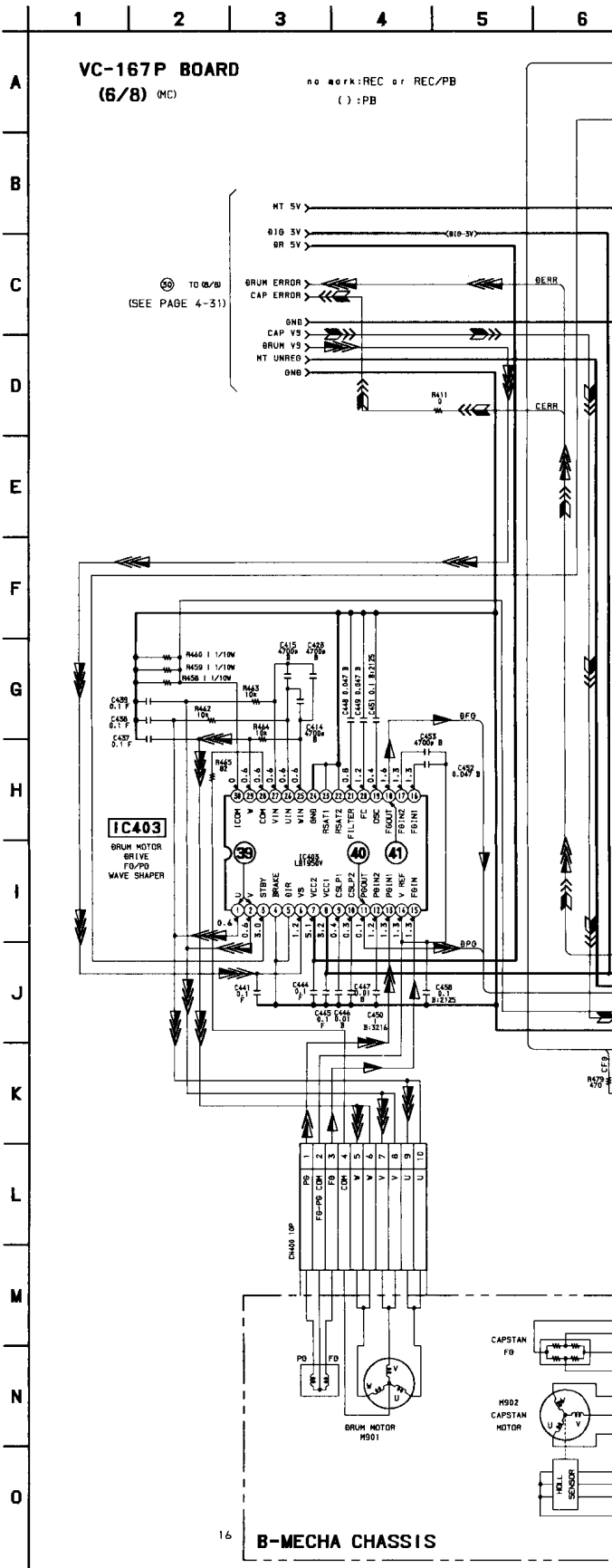
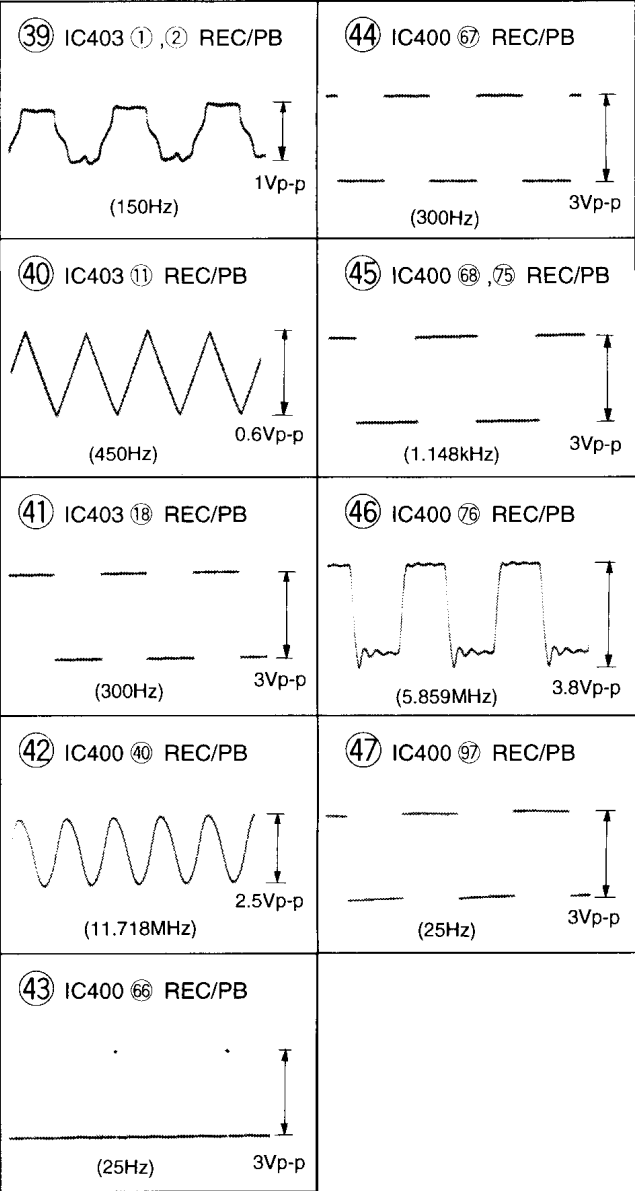
VIDEO SIGNAL			AUDIO SIGNAL
CHROMA	Y	Y/CHROMA	

VC-167P (MODE CONTROL), FP-249 (MODE SENSOR) SCHEMATIC DIAGRAMS

— Ref. No. VC-167P Board; 1,000 Series, FP-249 Board; 5,000 Series —

• See page 4-35 for VC-167P  
• See page 4-32 for FP-249 E

VC-167P BOARD

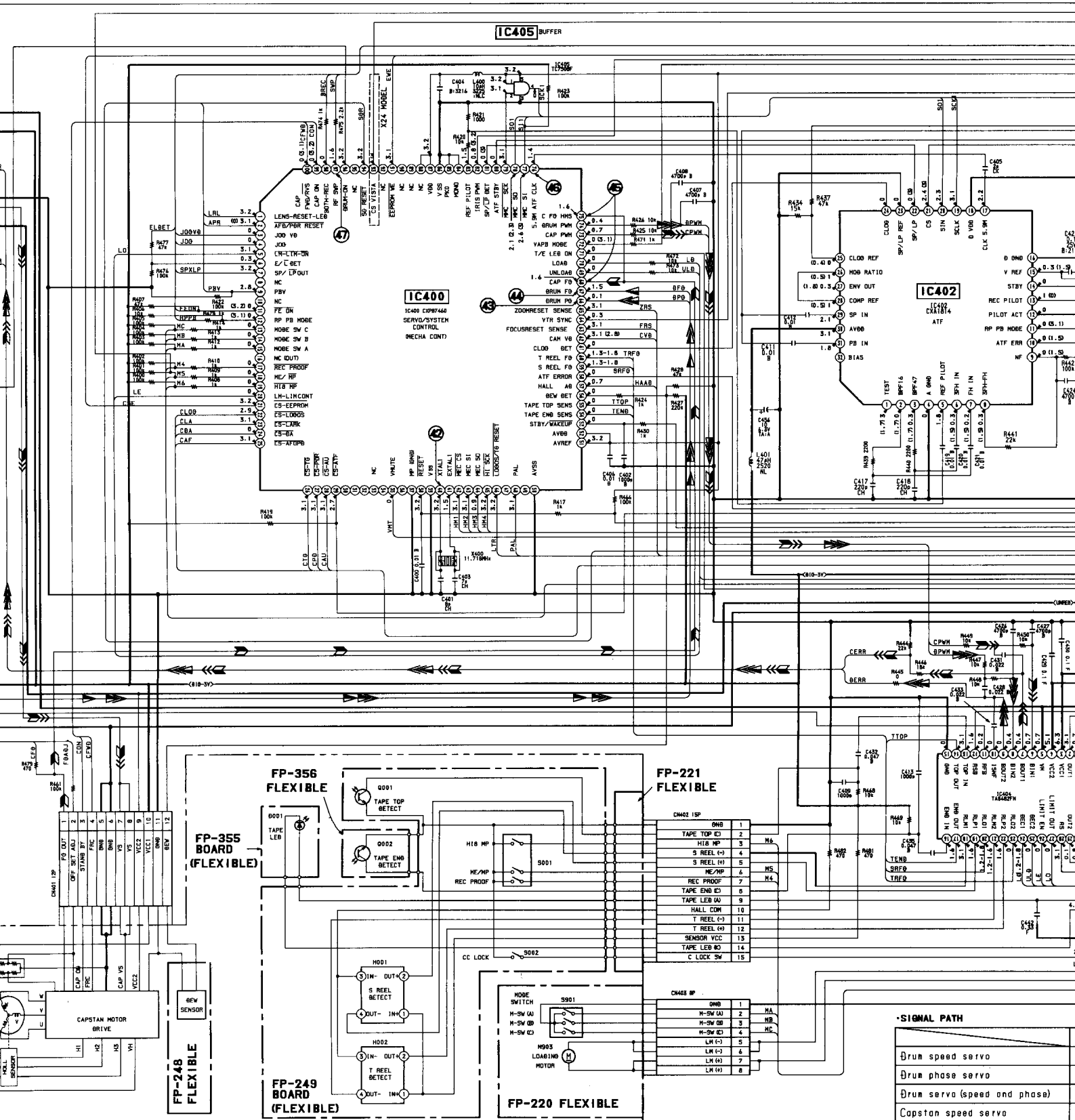




-167P BOARD printed wiring board.

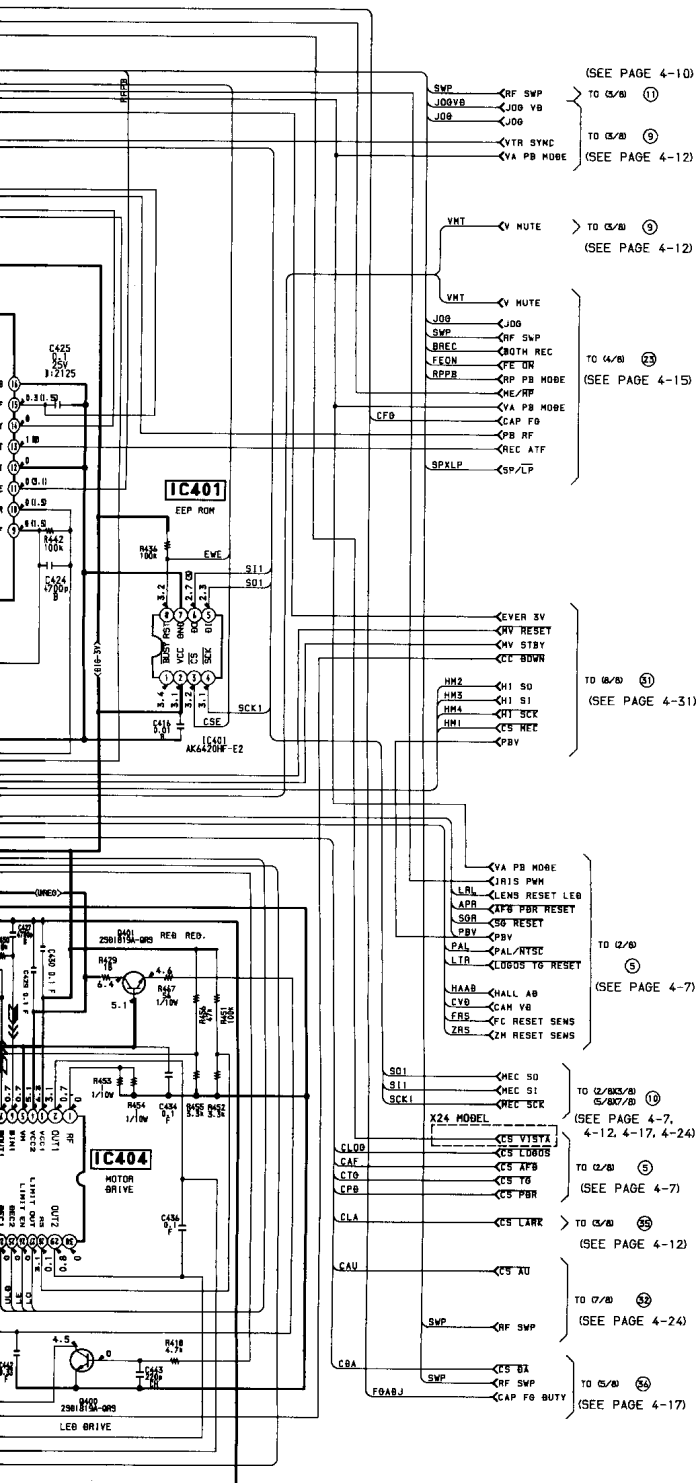
-249 BOARD printed wiring board.

6 7 8 9 10 11 12 13 14 15 16 17 18 19 20



•SIGNAL PATH

Drum speed servo
Drum phase servo
Drum servo (speed and phase)
Capstan speed servo
Capstan servo (speed and phase)
Ref. signal



(SEE PAGE 4-10)  
 SWP <RF SWP  
 J00VB <J00 VB  
 J00 <J00  
 VTR SYNC <VTR SYNC  
 VA PB MOBE <VA PB MOBE  
 TO 3/B ①  
 TO 3/B ②  
 (SEE PAGE 4-12)

VMT <V MUTE  
 TO 3/B ③  
 (SEE PAGE 4-12)

VMT <V MUTE  
 J00 <J00  
 SWP <RF SWP  
 BREC <BOTH REC  
 FEON <FE ON  
 RPPB <RP PB MOBE  
 ME/RF <ME/RF  
 VA PB MOBE <VA PB MOBE  
 CAP F0 <CAP F0  
 PB RF <PB RF  
 REC ATF <REC ATF  
 SPXLP <SP/LP  
 TO 4/B ④  
 (SEE PAGE 4-15)

EVER 3V  
 HV RESET  
 HV STBY  
 CC DOWN  
 HM2 <H1 S0  
 HM3 <H1 S1  
 HM4 <H1 SCK  
 HM1 <CS REC  
 PBV  
 TO 8/B ⑤  
 (SEE PAGE 4-31)

VA PB MOBE  
 LRL <LRL PMW  
 APR <APR PBR RESET  
 SOR <SOR RESET  
 PBV  
 PAL/RTSC  
 LTR <LDRS TO RESET  
 HAAB <HALL AB  
 CVB <CAM VB  
 FRS <FC RESET SENS  
 ZRS <ZM RESET SENS  
 TO 3/B ⑥  
 (SEE PAGE 4-7)

SQ1 <REC S0  
 S11 <REC S1  
 SCK1 <REC SCK  
 X24 MODEL  
 CS VISTA  
 CS LDRS  
 TO 2/3/B ⑦  
 (SEE PAGE 4-7, 4-12, 4-17, 4-24)

CL0B <CS VISTA  
 CAF <CS LDRS  
 CT0 <CS XFB  
 CPB <CS YB  
 TO 2/B ⑧  
 (SEE PAGE 4-7)

CLA <CS LARR  
 TO 3/B ⑨  
 (SEE PAGE 4-12)

CAU <CS XU  
 TO 3/B ⑩  
 (SEE PAGE 4-24)

SWP <RF SWP  
 TO 7/B ⑪  
 (SEE PAGE 4-24)

CSA <CS DA  
 SWP <RF SWP  
 FOABJ <CAP F0 BUTY  
 TO 5/B ⑫  
 (SEE PAGE 4-17)

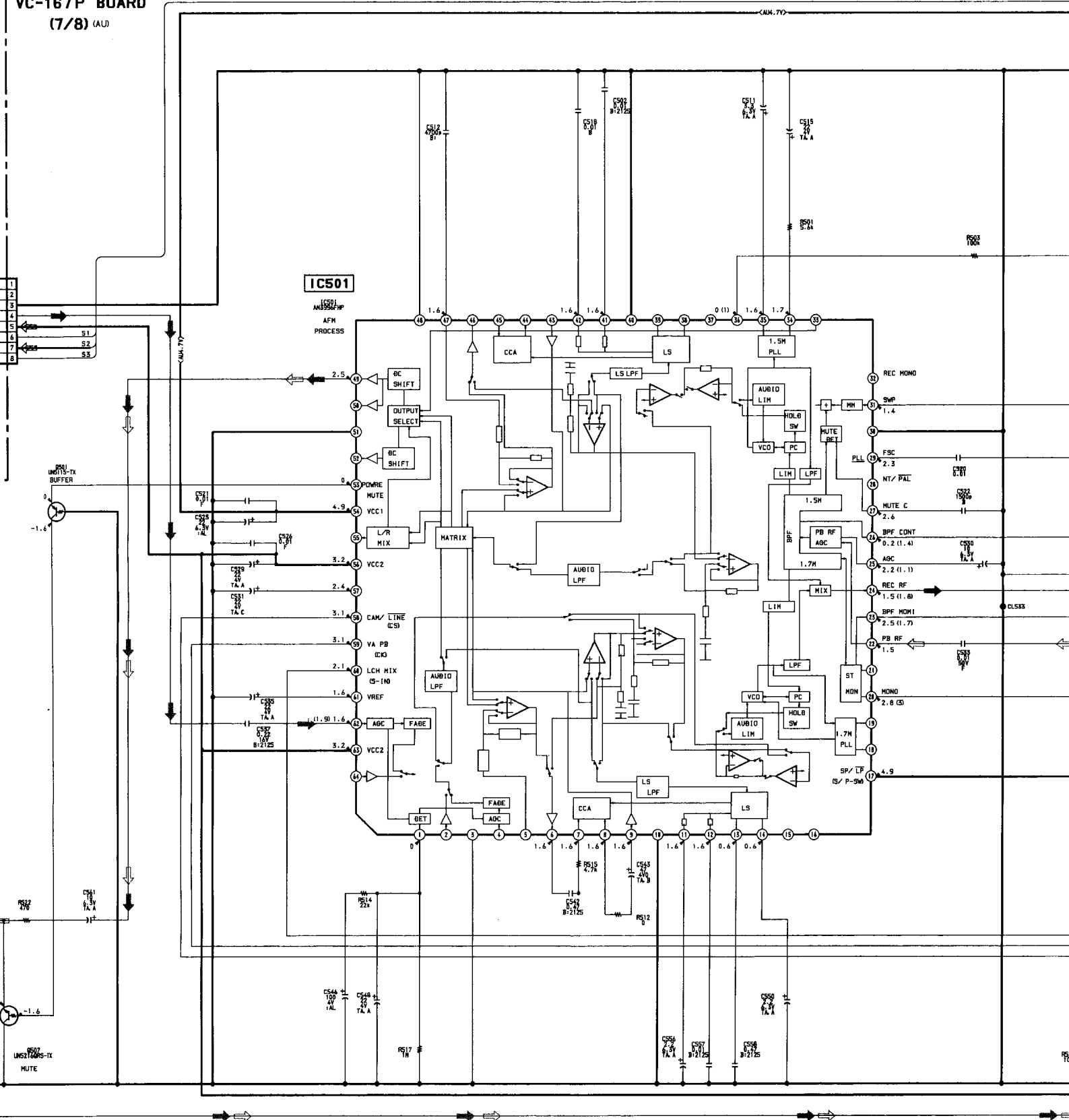
	REC	REC/PB	PB
		▶	
		▶▶	
(hase)		▶▶▶	
		▶▶▶▶	
d phase)		▶▶▶▶▶	

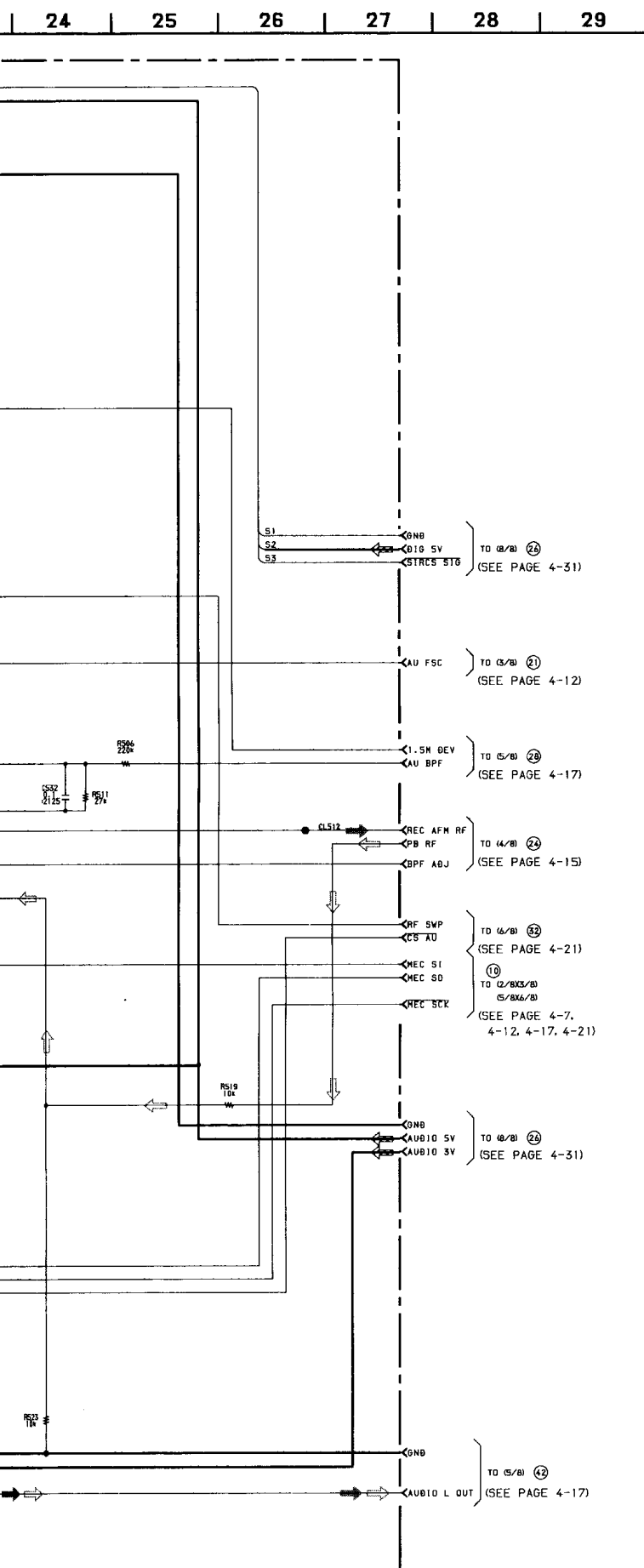
- See page 4-34 for VC-167P BOARD print

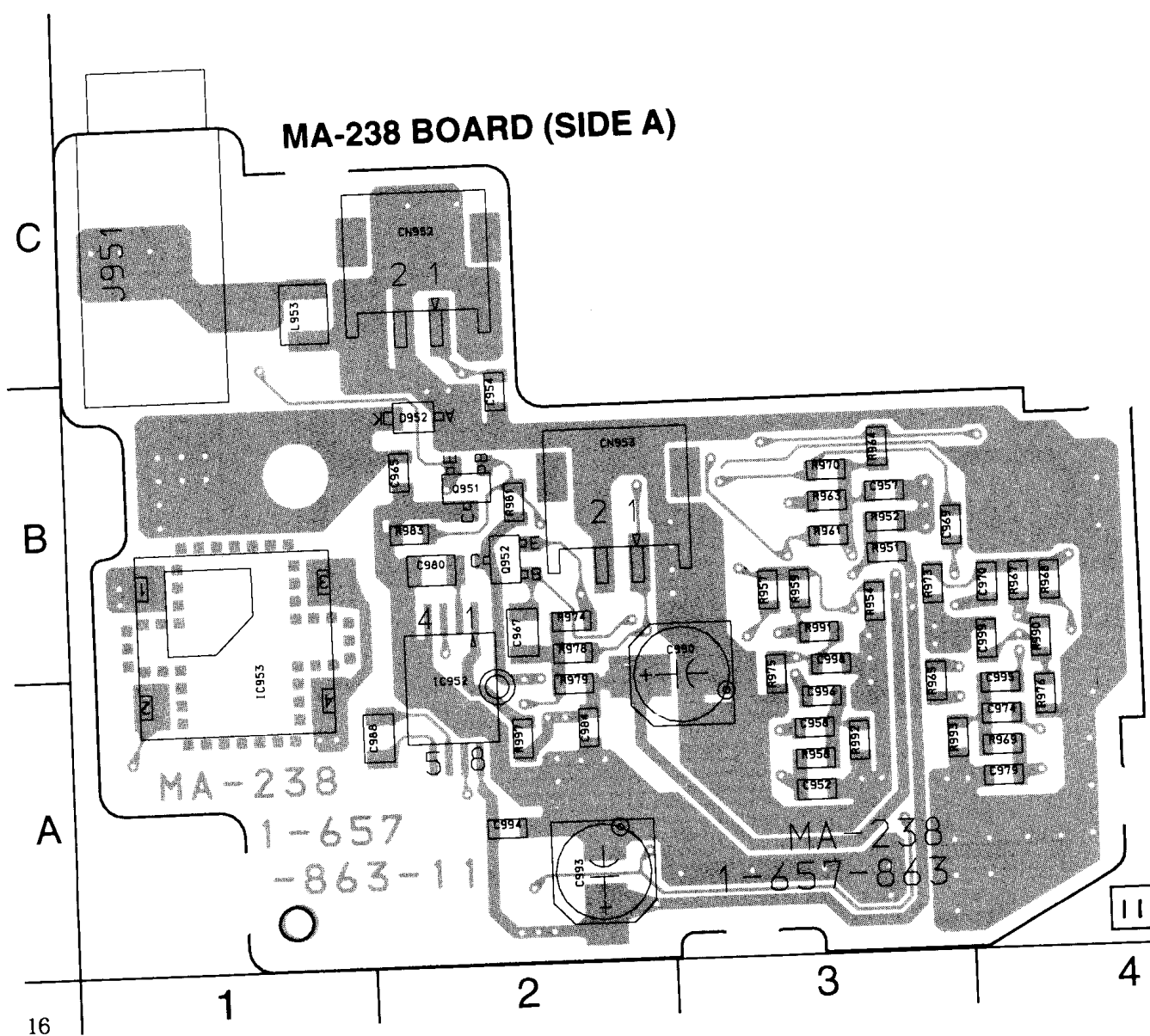
- See page 4-34 for VC-167P BOARD print



1 12 13 14 15 16 17 18 19 20 21 22 23

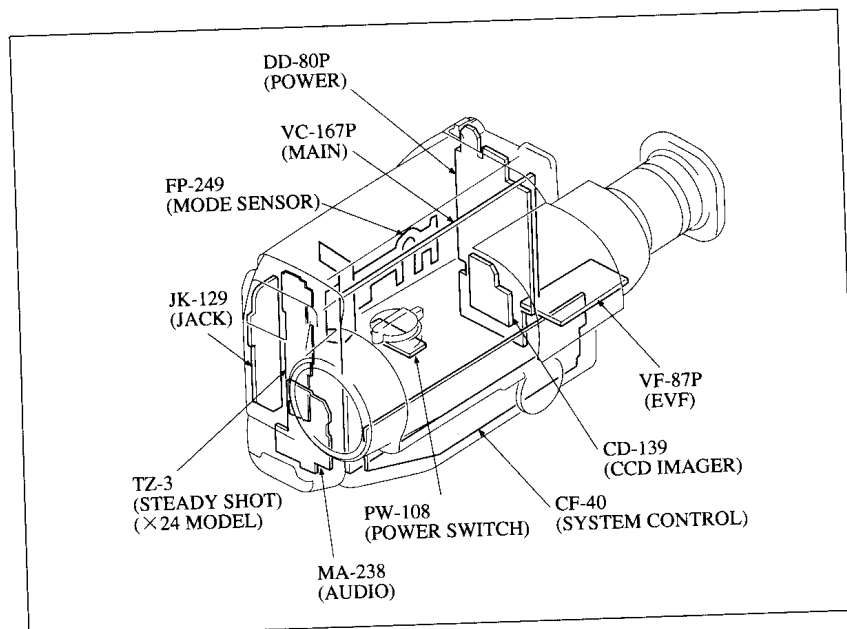
VC-167P BOARD  
(7/8) (AU)





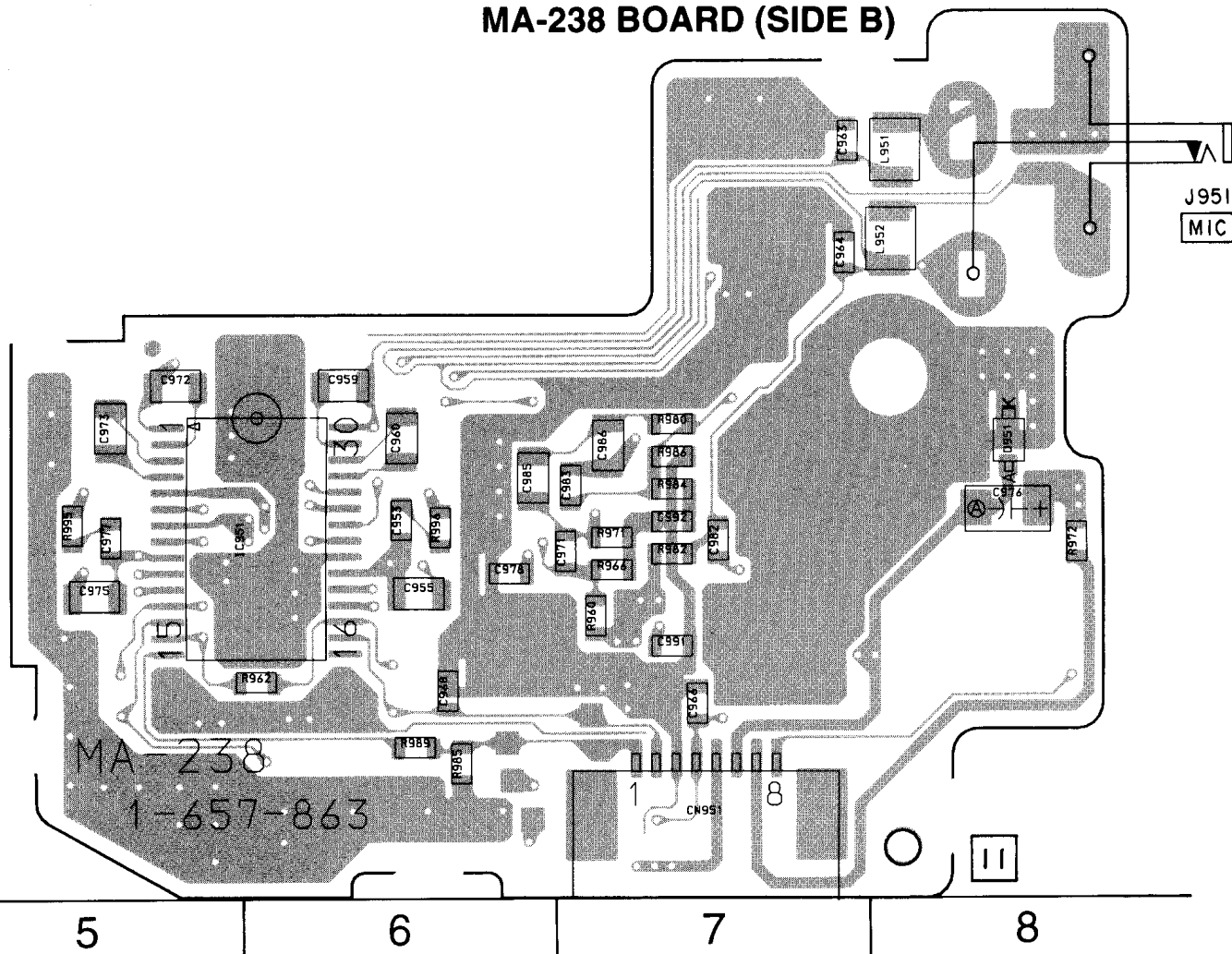
**MA-238 BOARD**

C964	C-7	IC953	B-1
C978	B-6		
C980	B-2	J951	C-1
C982	B-7		
C983	B-7	L952	C-8
C984	A-2	L953	C-1
C985	B-6		
C986	B-7	Q951	B-2
C988	A-2		
C990	B-3	R972	B-8
C991	A-7	R974	B-2
C993	A-2	R978	B-2
		R979	A-2
CN951	A-7	R980	B-7
CN953	B-2	R981	B-2
		R982	B-7
D951	B-8	R983	B-2
D952	B-2	R997	A-2
IC952	A-2		



in this model.

# MA-238 BOARD (SIDE B)

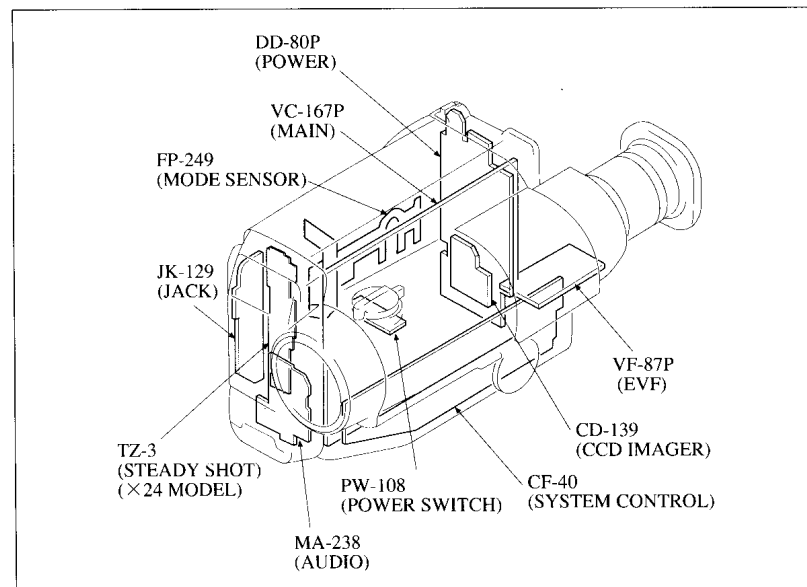


# DD-80P (POWER) PRINTED WIRING BOARD

— Ref. No. DD-80P Board; 1,000 Series —

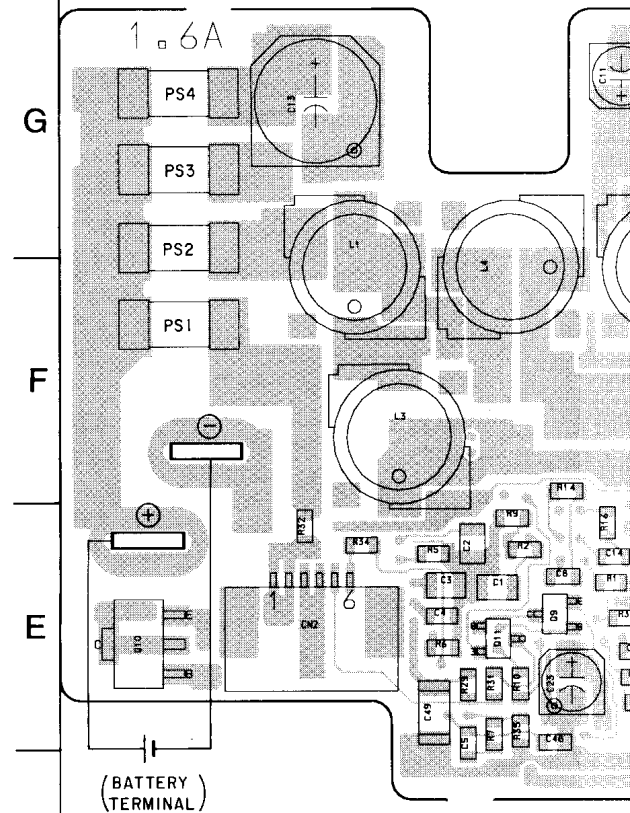
## DD-80P BOARD

C001	E-2	C046	F-6	Q005	B-4
C002	E-2	C047	B-3	Q006	B-4
C003	E-2	C048	E-3	Q007	B-5
C004	E-2			Q008	C-4
C005	E-2	CN003	E-5		
C006	B-2			R001	E-3
C007	C-2	D001	B-4	R002	E-2
C008	E-3	D002	F-7	R003	E-3
C009	C-3			R004	B-2
C010	G-3	IC001	C-3	R005	E-2
C011	G-3			R006	E-2
C012	G-3	J001	B-1	R007	E-2
C013	G-1			R008	C-2
C014	E-3	L001	G-2	R009	E-2
C016	E-3	L002	G-3	R010	E-2
C018	B-3	L003	F-2	R014	F-3
C019	C-3	L004	F-2	R015	D-3
C022	B-3	L005	F-4	R016	E-3
C024	E-3	L006	G-4	R017	B-3
C025	E-3	L007	G-5	R018	E-3
C026	B-3	L008	F-4	R019	E-3
C027	E-3	L009	F-5	R020	B-3
C028	B-4	L010	C-5	R021	B-3
C029	B-5	L011	C-5	R022	E-3
C030	A-4	L012	C-6	R023	C-7
C031	E-4	L013	C-6	R024	C-4
C032	F-4	L014	C-4	R025	C-4
C033	G-6	L015	B-4	R026	C-4
C034	E-5	L016	C-5	R027	A-6
C035	B-4	L017	B-6	R033	B-7
C036	F-6	L018	B-6		
C037	B-4			S001	G-6
C038	E-5	PS002	G-1	S002	C-7
C039	F-6	PS003	G-1	S004	G-4
C040	E-6	PS004	G-1		
C041	E-6			T001	G-4
C042	E-5	Q001	B-5		
C043	E-6	Q002	A-5		
C044	F-6	Q003	A-4		
C045	F-6	Q004	B-4		

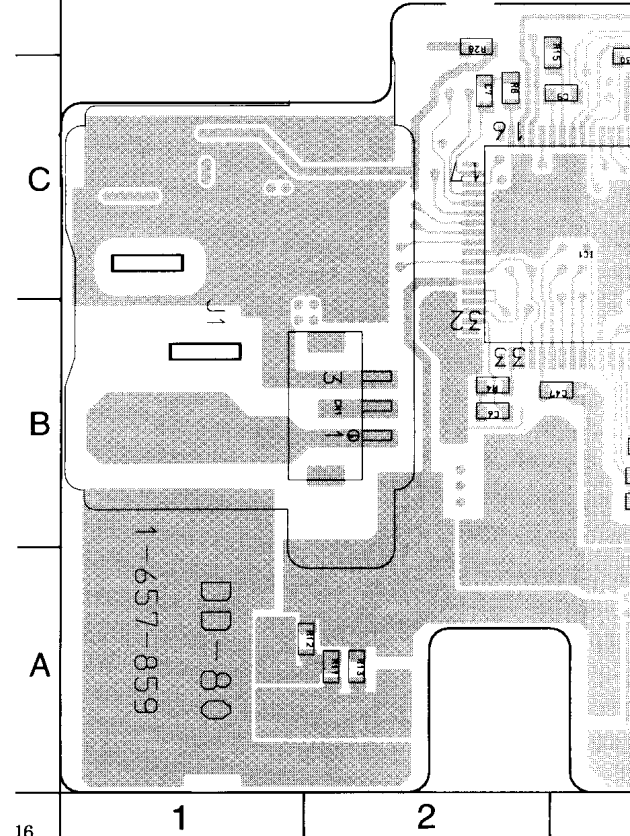


There are few cases that the part p

## DD-80P BOARD (SIDE A)

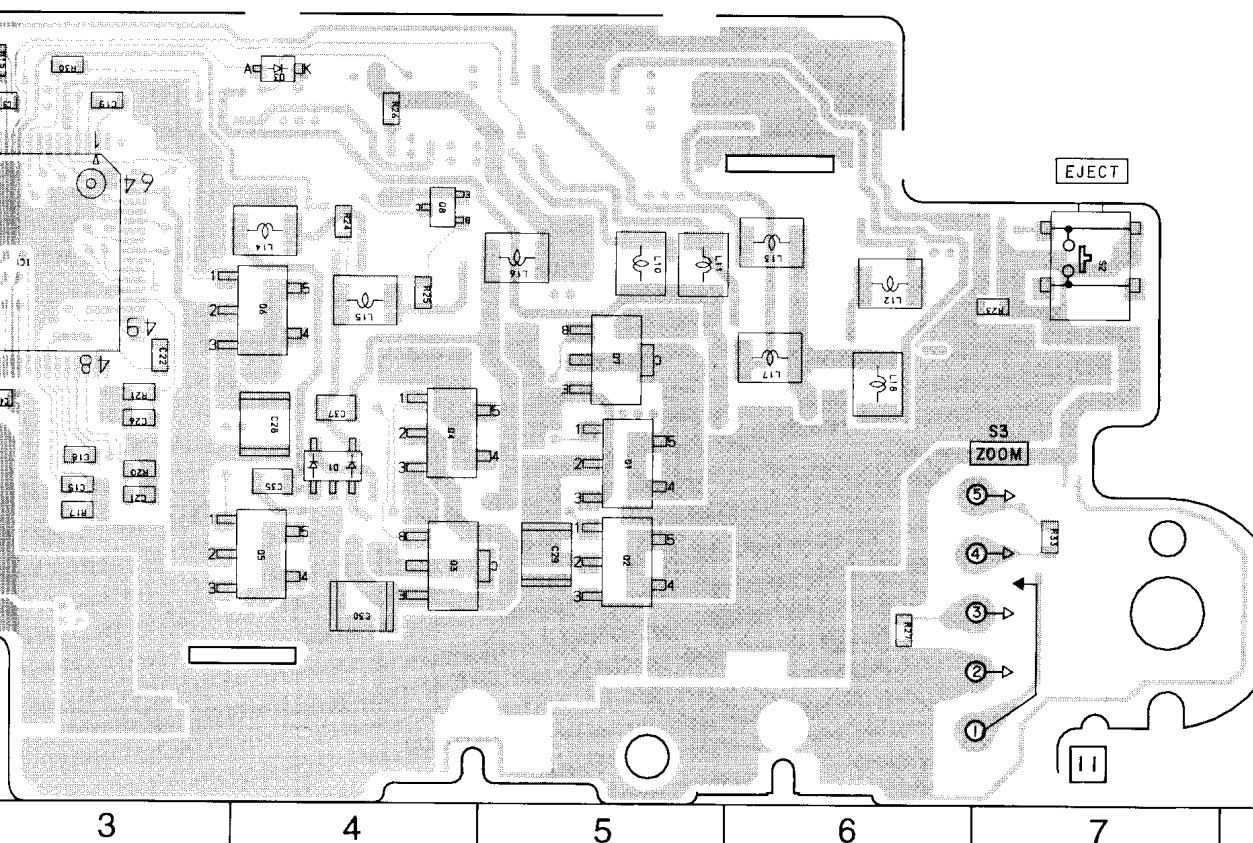
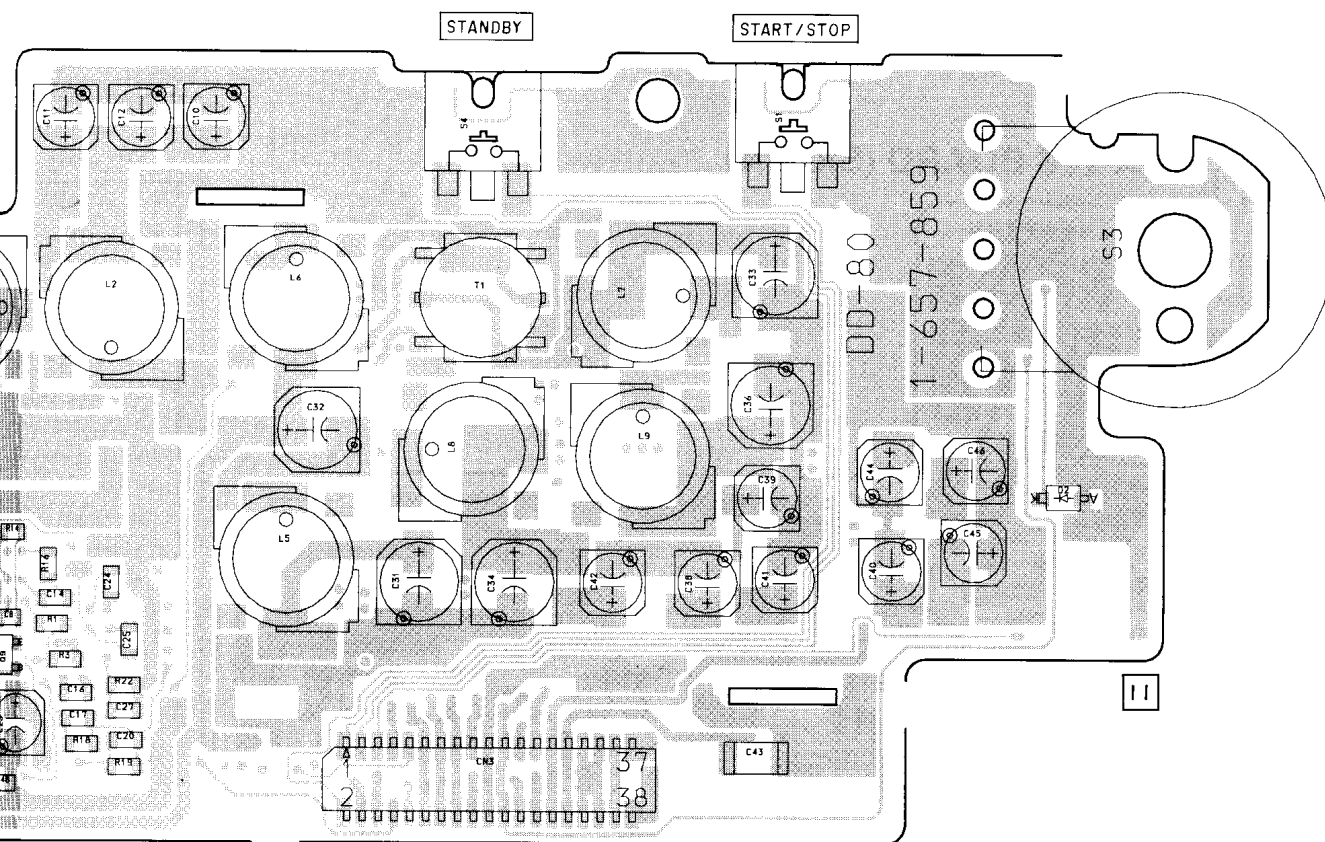


## DD-80P BOARD (SIDE B)





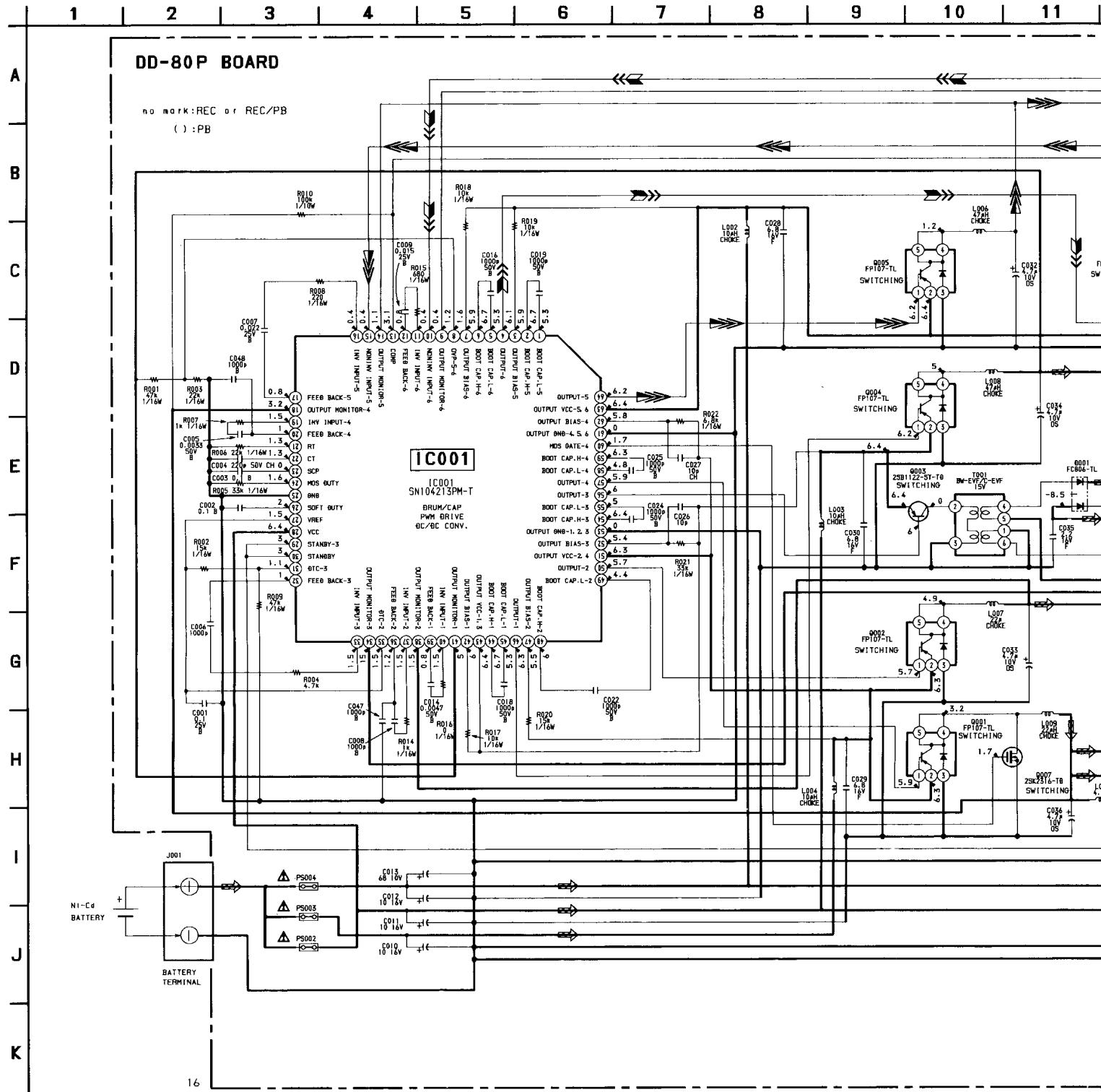
the part printed on this diagram isn't mounted in this model.



DD-80P (POWER), VC-167P (VTR SWITCH) SCHEMATIC DIAGRAMS

• See page 4-34 for VC-167P BOARD printed v

— Ref. No. DD-80P Board, VC-167P Board; 1,000 Series —

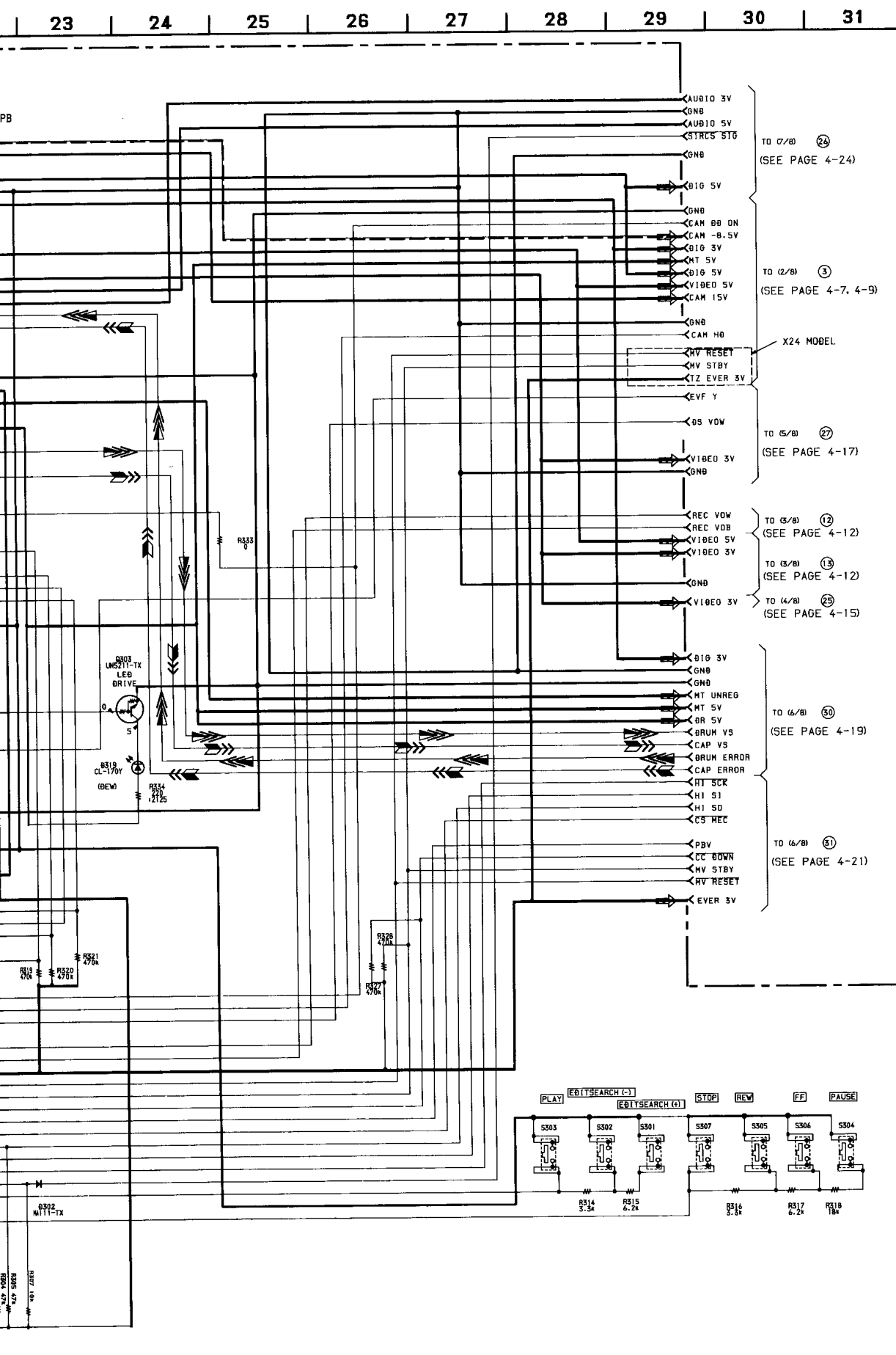


•SIGNAL PATH			
	REC	REC/PB	PB
Drum speed servo			
Drum phase servo			
Drum servo (speed and phase)		➡➡➡	
Capstan speed servo			
Capstan phase servo			
Capstan servo (speed and phase)		➡➡➡	
Ref. signal			

Note:  
The components identified by mark **▲** or dotted line with mark **▲** are critical for safety.  
Replace only with part number specified.

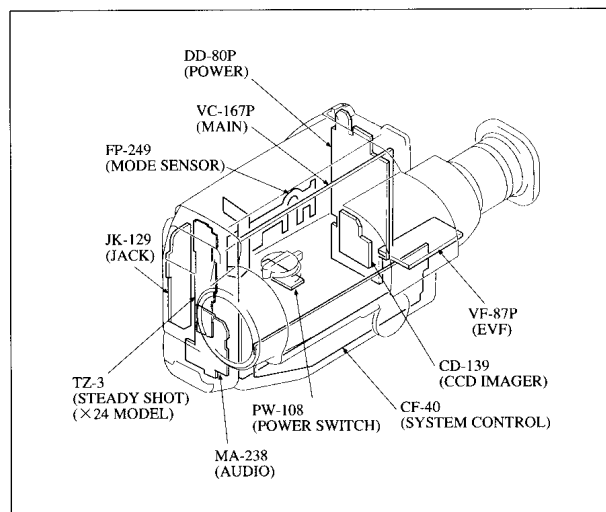
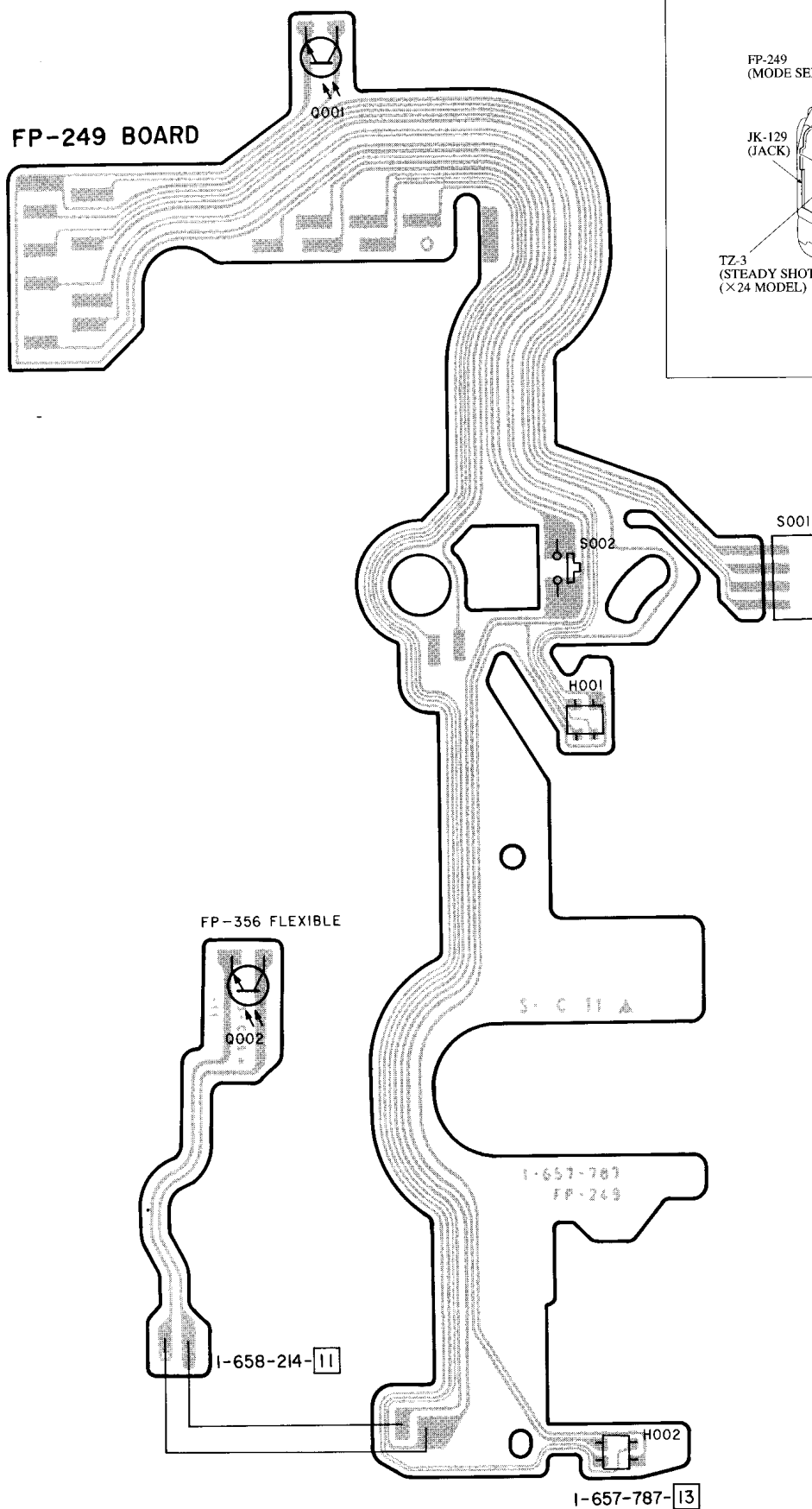
11	12	13	14	15	16	17	18	19	20	21	22
----	----	----	----	----	----	----	----	----	----	----	----





# FP-249 (MODE SENSOR) PRINTED WIRING BOARD

— Ref. No. FP-249 Board; 5,000 Series —



# VC-167P BOARD

C061	(B)F-2	C203	(B)F-3	C417	(A)C-9	C574	(A)D-1	C760	(A)G-8	L102	(A)A-5	Q123	(B)B-3
C072	(A)D-7	C204	(A)E-3	C418	(A)B-9	C575	(A)D-1	C761	(A)F-9	L103	(A)B-6	Q124	(A)B-3
C073	(B)D-6	C205	(B)F-3	C419	(B)C-9	C576	(A)D-1	C762	(B)G-7	L104	(B)B-6	Q125	(A)B-3
C075	(A)F-2	C206	(B)F-3	C420	(A)C-9	C577	(A)D-1	C764	(A)E-8	L105	(B)B-5	Q126	(A)C-3
C076	(B)E-2	C207	(A)E-4	C421	(A)C-9	C578	(B)D-1	C772	(A)E-8	L106	(A)B-5	Q129	(B)A-3
C077	(B)E-2	C208	(A)E-4	C423	(A)A-7	C602	(A)F-3			L107	(A)B-6	Q130	(B)A-3
C078	(B)E-2	C209	(B)F-4	C424	(A)C-9	C603	(A)F-3	CN060	(B)F-1	L108	(A)B-5	Q131	(B)B-3
C101	(B)A-4	C210	(A)F-3	C425	(B)B-9	C604	(A)G-2	CN101	(B)A-5	L109	(A)B-5	Q202	(B)F-4
C102	(B)A-5	C211	(A)F-3	C426	(B)A-9	C605	(B)F-2	CN102	(A)B-1	L113	(B)B-5	Q206	(A)E-4
C103	(B)A-4	C212	(B)F-4	C427	(B)A-9	C606	(A)F-3	CN300	(B)B-8	L114	(B)B-3	Q212	(A)C-3
C104	(B)A-5	C213	(B)F-3	C428	(A)A-9	C607	(A)F-3	CN301	(A)E-10	L115	(B)B-3	Q213	(A)C-4
C106	(A)A-6	C214	(B)F-3	C429	(B)A-9	C608	(A)F-3	CN400	(B)A-6	L116	(A)C-3	Q214	(A)C-4
C107	(B)B-6	C215	(A)E-3	C430	(B)A-9	C609	(A)G-2	CN401	(B)A-7	L118	(A)C-3	Q215	(B)E-5
C108	(B)A-6	C216	(B)G-2	C431	(A)A-8	C610	(A)G-2	CN402	(B)A-9	L119	(A)A-4	Q216	(A)D-2
C109	(B)A-6	C217	(B)G-2	C432	(A)A-9	C611	(B)G-3	CN403	(B)A-3	L120	(B)B-4	Q217	(A)D-2
C110	(B)A-6	C218	(A)D-3	C433	(A)A-9	C612	(B)G-3	CN501	(B)B-1	L121	(A)B-4	Q218	(B)D-2
C111	(A)A-4	C219	(B)F-4	C434	(B)B-8	C613	(B)F-5	CN601	(B)G-3	L202	(B)F-3	Q219	(A)C-3
C112	(A)A-4	C220	(B)E-5	C435	(A)A-9	C614	(B)F-4	CN701	(B)F-5	L203	(B)E-4	Q221	(A)F-5
C113	(B)A-4	C223	(A)D-4	C436	(A)A-8	C615	(B)F-4	CN702	(A)F-9	L207	(B)E-5	Q222	(A)D-2
C114	(A)A-4	C224	(A)E-5	C437	(B)A-7	C616	(A)G-4			L210	(B)D-3	Q223	(B)D-2
C115	(A)A-5	C225	(A)E-5	C438	(B)A-7	C618	(B)G-3	D101	(B)B-4	L211	(B)D-4	Q224	(B)D-2
C116	(B)A-5	C226	(B)D-5	C439	(B)A-7	C619	(B)G-3	D102	(B)B-3	L212	(A)C-5	Q226	(A)F-4
C117	(A)A-5	C227	(B)D-5	C441	(A)A-7	C620	(A)G-2	D103	(A)C-4	L213	(B)F-3	Q303	(A)E-9
C118	(A)A-5	C228	(A)E-5	C442	(B)A-10	C701	(B)G-5	D201	(B)E-5	L214	(B)D-6	Q400	(B)A-9
C119	(B)A-5	C229	(B)D-5	C443	(B)A-9	C702	(B)G-5	D202	(A)F-3	L400	(A)D-8	Q401	(B)A-9
C120	(B)A-5	C230	(B)D-5	C444	(A)A-7	C703	(B)G-5	D203	(A)C-4	L401	(A)B-9	Q501	(B)A-2
C121	(B)B-5	C231	(A)E-3	C445	(A)A-7	C704	(B)F-5	D302	(B)B-8	L570	(B)E-2	Q507	(B)A-2
C122	(B)B-5	C232	(A)E-3	C446	(A)A-7	C706	(B)F-5	D319	(B)G-8	L601	(B)G-2	Q570	(A)C-1
C123	(B)B-5	C234	(A)D-4	C447	(A)A-6	C707	(B)G-5	D701	(A)G-6	L602	(B)G-4	Q601	(A)F-3
C124	(A)B-5	C235	(A)D-4	C448	(B)A-6	C708	(B)G-5	D702	(A)G-5	L603	(A)G-3	Q602	(B)F-2
C125	(A)B-5	C236	(A)D-4	C449	(B)A-7	C710	(A)F-5	D703	(A)F-5	L701	(A)F-6	Q603	(B)G-3
C127	(B)B-5	C237	(B)D-4	C450	(A)A-6	C711	(A)G-6	D705	(B)G-8	L703	(A)G-6	Q701	(B)G-5
C128	(B)B-5	C238	(B)D-3	C451	(B)A-6	C712	(B)G-6	D706	(B)G-6	L704	(A)F-5	Q703	(B)G-10
C129	(B)B-5	C240	(A)E-3	C452	(A)A-6	C713	(A)G-6	IC707	(A)IF-8	L706	(A)G-8	Q704	(B)G-10
C130	(A)B-5	C242	(A)C-5	C453	(A)A-6	C714	(A)F-6			L707	(A)G-7	Q705	(B)G-9
C134	(B)B-4	C243	(B)F-3	C456	(A)B-9	C715	(B)F-6	IC061	(A)D-6	L708	(A)G-7	Q706	(B)G-9
C135	(A)A-4	C244	(B)D-4	C458	(A)A-6	C717	(A)G-6	IC101	(B)B-5	L709	(A)G-9	Q750	(B)E-9
C136	(A)B-4	C246	(A)D-4	C502	(A)A-2	C718	(B)G-6	IC201	(B)E-4	L710	(B)F-10	Q752	(B)E-8
C137	(A)B-4	C247	(B)D-2	C511	(A)A-3	C719	(A)E-6	IC204	(A)F-4	L712	(A)F-7	Q753	(A)E-8
C138	(A)B-5	C248	(A)C-2	C512	(A)A-2	C720	(B)F-5	IC400	(B)C-8	L714	(A)F-6	R060	(A)F-2
C139	(A)B-5	C249	(A)C-2	C515	(A)A-3	C722	(A)F-6	IC401	(A)D-9	L715	(A)F-7	R061	(B)F-2
C140	(A)B-6	C252	(B)D-5	C518	(A)A-2	C724	(B)G-6	IC402	(A)C-9	L716	(A)G-9	R062	(B)D-6
C141	(A)B-5	C254	(A)F-5	C520	(B)C-2	C725	(A)E-5	IC403	(A)A-7	L751	(A)E-9	R063	(A)E-1
C142	(A)B-5	C256	(A)D-3	C521	(B)B-2	C726	(A)F-5	IC404	(A)A-9	L752	(A)E-8	R077	(A)F-2
C143	(A)B-6	C257	(A)F-4	C522	(B)B-3	C727	(B)F-5	IC405	(B)C-9			R078	(A)F-2
C148	(B)B-3	C260	(B)D-6	C523	(B)B-2	C728	(B)E-5	IC501	(A)B-2	Q060	(A)E-1	R079	(A)F-2
C149	(B)B-3	C261	(A)C-3	C526	(A)B-1	C729	(B)E-5	IC570	(B)D-2	Q061	(A)F-2	R080	(A)F-2
C150	(B)B-3	C263	(B)D-2	C529	(A)B-2	C730	(A)G-5	IC601	(A)G-3	Q062	(A)F-1	R081	(B)E-2
C152	(A)B-3	C265	(B)D-3	C530	(B)A-3	C731	(A)F-6	IC602	(A)F-2	Q063	(B)E-2	R082	(B)E-2
C153	(B)B-4	C266	(B)D-3	C531	(A)C-1	C732	(B)E-6	IC603	(B)G-4	Q064	(A)E-2	R083	(B)E-2
C154	(B)B-3	C400	(B)C-8	C532	(B)B-2	C734	(B)G-6	IC604	(A)G-4	Q065	(A)E-2	R084	(A)E-2
C155	(B)B-3	C401	(B)C-8	C533	(B)B-3	C735	(A)G-8	IC701	(A)F-5	Q101	(A)A-5	R085	(B)E-2
C156	(B)B-4	C402	(B)B-9	C535	(B)B-2	C736	(A)G-8	IC702	(B)F-6	Q102	(A)B-5	R086	(A)D-2
C157	(B)C-3	C403	(B)C-8	C537	(B)B-2	C739	(B)G-7	IC703	(B)E-6	Q103	(A)B-6	R087	(B)E-2
C160	(B)B-5	C404	(B)D-8	C542	(A)C-1	C740	(B)G-8	IC704	(B)F-6	Q104	(B)B-6	R088	(B)E-2
C162	(B)A-3	C405	(A)C-9	C543	(A)C-2	C741	(B)G-9	IC705	(A)F-7	Q105	(A)A-6	R091	(B)E-2
C163	(B)A-3	C406	(B)C-9	C546	(B)C-1	C742	(B)G-9	IC706	(B)F-8	Q106	(A)A-6	R092	(B)E-2
C164	(A)A-3	C407	(A)D-8	C548	(A)C-2	C745	(B)E-8	IC707	(A)F-8	Q107	(B)A-6	R101	(B)B-6
C165	(A)A-3	C408	(A)D-8	C550	(B)C-2	C746	(B)F-9	IC708	(A)G-5	Q108	(B)B-4	R102	(A)B-4
C166	(A)B-3	C409	(A)A-10	C556	(A)C-2	C749	(A)F-7	IC709	(B)G-9	Q109	(B)B-4	R103	(A)B-5
C167	(A)B-3	C411	(B)B-9	C557	(A)C-3	C750	(A)F-7	IC710	(B)G-7	Q110	(A)B-4	R104	(A)A-5
C168	(B)A-4	C412	(B)B-9	C558	(B)C-2	C751	(A)F-6			Q111	(A)B-4	R105	(A)B-5
C169	(A)B-4	C413	(A)A-9	C561	(B)A-2	C755	(A)F-6	L061	(A)E-1	Q112	(A)B-5	R106	(A)B-5
C170	(A)C-4	C414	(A)A-8	C571	(A)D-1	C757	(A)F-6	L062	(B)D-6	Q113	(A)B-5	R107	(B)B-5
C171	(B)C-6	C415	(A)A-7	C572	(A)D-1	C758	(B)E-6	L063	(A)G-2	Q114	(B)B-6	R108	(B)B-5
C202	(A)E-3	C416	(B)D-9	C573	(A)E-1	C759	(B)E-7	L101	(A)A-4	Q120	(A)C-5	R109	(B)B-5

R110	(B)B-6	R191	(B)B-6	R284	(B)D-2	R448	(A)A-9	R620	(B)G-2
R111	(B)B-5	R192	(B)A-6	R286	(B)D-2	R449	(A)B-8	R621	(B)G-2
R112	(A)B-6	R193	(B)A-6	R287	(B)D-3	R450	(A)A-8	R623	(A)F-4
R113	(A)B-6	R194	(A)A-6	R289	(B)D-3	R451	(B)A-8	R628	(A)F-4
R114	(B)B-5	R195	(A)A-5	R290	(A)D-5	R452	(A)A-8	R629	(A)F-4
R115	(B)B-5	R196	(B)A-6	R291	(A)D-3	R453	(B)A-8	R630	(B)G-3
R116	(A)B-4	R197	(B)B-3	R301	(A)B-8	R454	(B)A-8	R631	(A)G-3
R117	(B)B-4	R201	(B)F-3	R302	(A)B-8	R455	(A)A-10	R632	(A)F-3
R118	(A)A-5	R202	(B)F-3	R303	(A)B-8	R456	(A)A-9	R701	(B)G-5
R119	(A)A-6	R203	(B)F-3	R304	(B)B-8	R458	(A)A-7	R702	(B)G-5
R120	(A)B-4	R204	(A)E-4	R305	(A)B-8	R459	(A)A-8	R703	(B)F-5
R121	(A)B-4	R205	(B)G-1	R307	(B)B-8	R460	(A)A-8	R704	(B)G-5
R122	(A)B-4	R207	(A)F-5	R314	(A)G-6	R461	(A)A-8	R706	(A)G-6
R123	(A)B-4	R210	(A)E-5	R315	(A)G-2	R462	(B)A-7	R707	(A)G-6
R125	(A)B-5	R211	(A)E-4	R316	(A)G-5	R463	(B)A-7	R708	(B)F-9
R126	(A)B-4	R212	(B)F-4	R317	(A)G-7	R464	(B)A-7	R709	(A)F-6
R127	(A)B-5	R213	(B)F-4	R318	(A)G-8	R465	(B)A-6	R710	(A)F-6
R128	(A)B-5	R214	(B)G-1	R319	(B)B-9	R466	(B)C-9	R713	(B)G-8
R129	(A)B-5	R215	(B)G-1	R320	(B)B-9	R467	(B)A-9	R714	(B)G-7
R130	(A)B-5	R216	(B)G-2	R321	(A)B-9	R468	(A)A-9	R715	(B)G-9
R131	(A)B-5	R218	(A)E-3	R327	(A)B-8	R469	(A)A-9	R716	(B)G-9
R132	(A)B-6	R219	(B)D-4	R328	(A)B-8	R471	(A)D-8	R717	(B)G-9
R133	(A)B-6	R220	(B)D-4	R329	(A)B-8	R472	(A)D-8	R719	(B)E-8
R134	(A)B-5	R221	(A)D-3	R330	(A)B-9	R473	(A)D-8	R720	(B)E-8
R135	(A)B-5	R222	(B)E-4	R333	(B)D-9	R474	(A)D-7	R721	(B)E-8
R136	(A)B-5	R223	(A)F-4	R334	(B)G-8	R475	(A)D-7	R722	(B)F-9
R141	(B)B-4	R224	(B)E-5	R400	(B)B-7	R476	(B)C-7	R723	(B)F-9
R149	(B)C-4	R225	(B)D-2	R401	(B)B-7	R477	(B)C-7	R724	(B)E-9
R150	(B)B-3	R227	(A)C-3	R402	(B)B-7	R478	(B)C-7	R725	(B)E-6
R152	(B)B-4	R228	(A)F-5	R403	(B)C-7	R479	(A)B-7	R726	(B)G-7
R153	(A)B-3	R229	(A)D-4	R404	(B)C-7	R481	(B)A-9	R727	(B)G-7
R154	(A)B-3	R230	(B)D-4	R405	(B)C-7	R482	(B)A-9	R728	(B)G-7
R155	(A)B-3	R232	(B)E-5	R406	(B)C-7	R501	(A)A-3	R729	(B)G-6
R156	(B)B-3	R234	(B)E-4	R407	(B)C-7	R503	(A)C-6	R730	(B)F-7
R157	(B)B-3	R235	(B)D-4	R408	(B)B-7	R506	(A)C-6	R732	(A)F-6
R158	(B)B-3	R236	(A)D-3	R409	(B)B-7	R511	(B)B-3	R733	(A)F-6
R159	(B)B-3	R238	(B)D-5	R410	(B)B-7	R512	(A)C-2	R734	(A)F-6
R160	(A)B-4	R239	(A)E-4	R411	(A)D-10	R514	(B)C-2	R735	(A)F-6
R161	(A)B-4	R241	(B)E-4	R412	(B)C-7	R515	(A)C-2	R737	(B)F-9
R162	(A)B-4	R243	(B)D-3	R413	(B)C-7	R517	(A)C-2	R740	(A)G-5
R163	(A)B-4	R247	(A)D-2	R414	(B)C-7	R519	(A)A-3	R741	(A)G-5
R164	(A)B-4	R248	(A)D-4	R417	(B)C-8	R522	(B)A-2	R742	(A)G-5
R165	(B)B-4	R249	(B)D-3	R418	(A)D-8	R523	(A)B-3	R743	(A)G-5
R166	(A)B-4	R254	(A)C-4	R419	(B)C-7	R531	(B)A-1	R744	(A)G-5
R167	(A)B-4	R255	(A)C-4	R420	(A)D-8	R556	(B)A-1	R745	(A)G-5
R168	(A)B-4	R256	(B)D-2	R421	(A)D-8	R570	(B)C-1	R751	(A)E-9
R169	(A)B-3	R257	(B)D-2	R422	(A)D-8	R571	(A)D-2	R756	(B)E-8
R170	(A)A-5	R259	(A)D-3	R423	(B)D-9	R575	(A)D-1	R757	(A)E-8
R171	(A)A-5	R260	(A)D-4	R424	(B)C-9	R581	(B)D-1	R758	(B)G-9
R172	(B)A-5	R261	(A)D-2	R425	(A)D-8	R601	(A)F-3	R759	(B)G-9
R173	(B)A-5	R262	(A)C-2	R426	(A)D-8	R603	(A)F-3	R760	(A)E-8
R176	(B)C-3	R265	(B)D-2	R427	(B)C-9	R604	(A)F-3	R775	(A)E-8
R177	(A)C-3	R266	(A)E-3	R428	(B)C-9	R605	(A)G-3		
R178	(B)A-3	R267	(B)D-4	R429	(B)A-9	R606	(B)F-3	S301	(A)G-1
R179	(B)A-3	R268	(B)D-2	R430	(B)B-8	R607	(A)G-2	S302	(A)G-3
R180	(A)A-3	R270	(B)D-2	R434	(A)B-9	R608	(A)G-2	S303	(A)G-6
R181	(A)A-3	R271	(A)D-2	R436	(B)D-9	R609	(A)G-2	S304	(A)G-9
R182	(A)A-4	R272	(B)D-2	R437	(A)B-9	R610	(A)G-2	S305	(A)G-5
R183	(A)A-3	R273	(A)C-3	R439	(A)C-9	R611	(B)F-2	S306	(A)G-8
R184	(A)B-4	R274	(A)C-3	R440	(A)C-9	R612	(A)F-3	S307	(A)G-4
R185	(B)A-3	R276	(A)C-3	R441	(A)C-9	R613	(A)F-3		
R186	(B)A-3	R277	(A)C-3	R442	(A)C-9	R614	(A)F-3	X400	(A)C-8
R187	(B)A-3	R279	(B)C-3	R444	(B)A-10	R615	(B)F-3	X701	(B)G-6
R188	(B)B-6	R281	(B)D-3	R445	(B)B-10	R616	(A)F-3	X702	(B)G-8
R189	(B)B-6	R282	(B)D-3	R446	(B)A-10	R618	(B)F-2		
R190	(B)A-6	R283	(B)D-3	R447	(A)B-9	R619	(B)G-2		

— Ref. No. VC-167P Board; 1,000 Series —

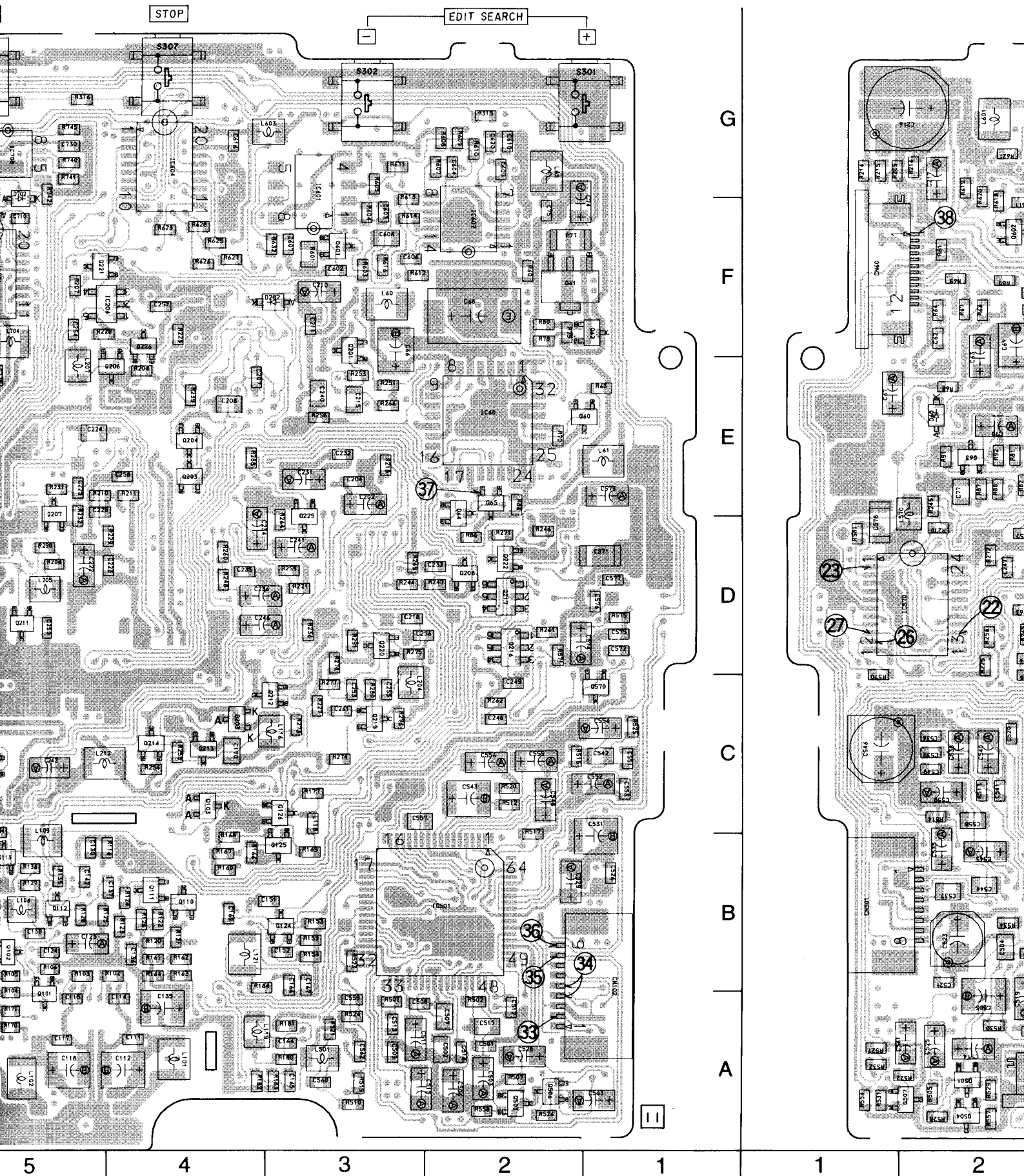
## VC-167P BOARD (SIDE A)



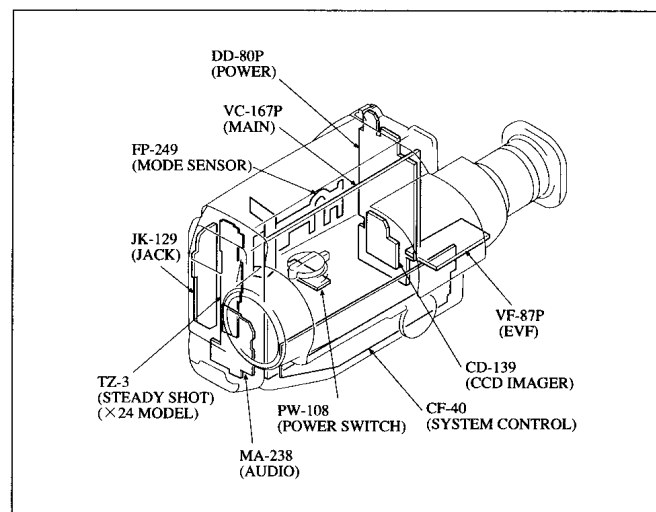
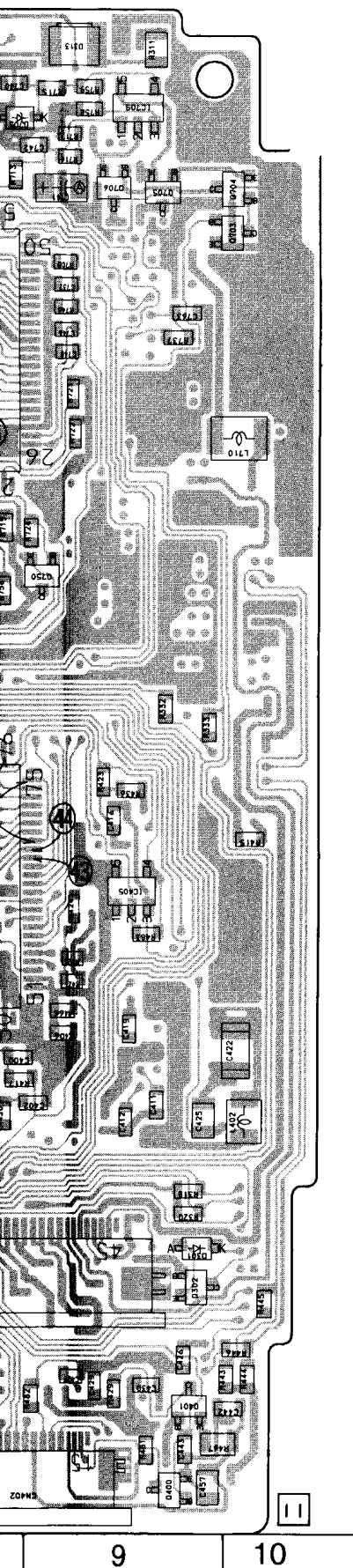


in this model.

VC-167P BOARD (S







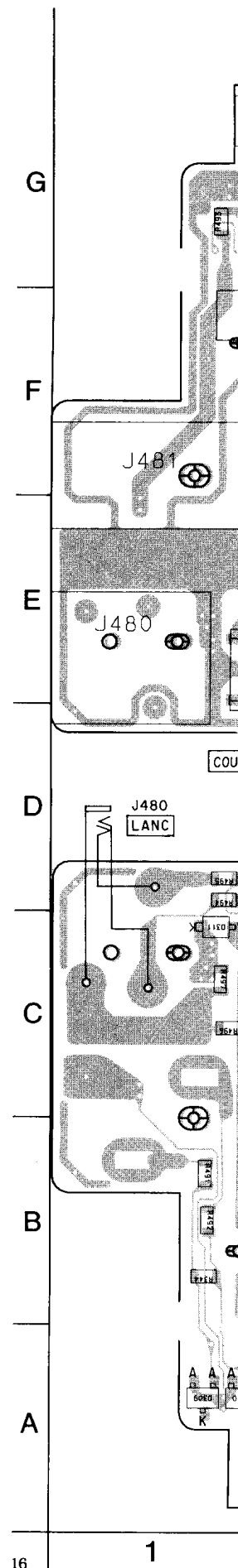
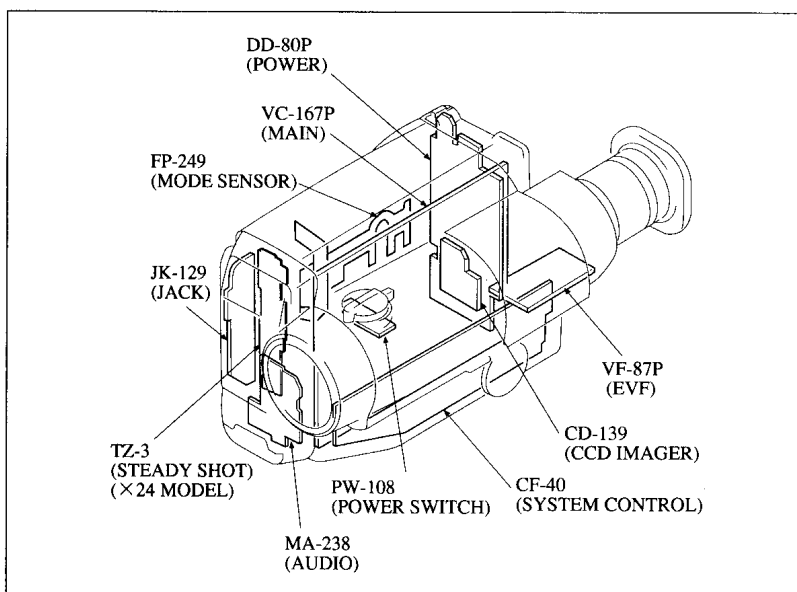
# CF-40 (SYSTEM CONTROL), PW-108 (POWER SWITCH) PRINTED WIRING BOARDS

— Ref. No. CF-40 Board, PW-108 Board; 2,000 Series —

There are few cases that the pa

## CF-40 BOARD

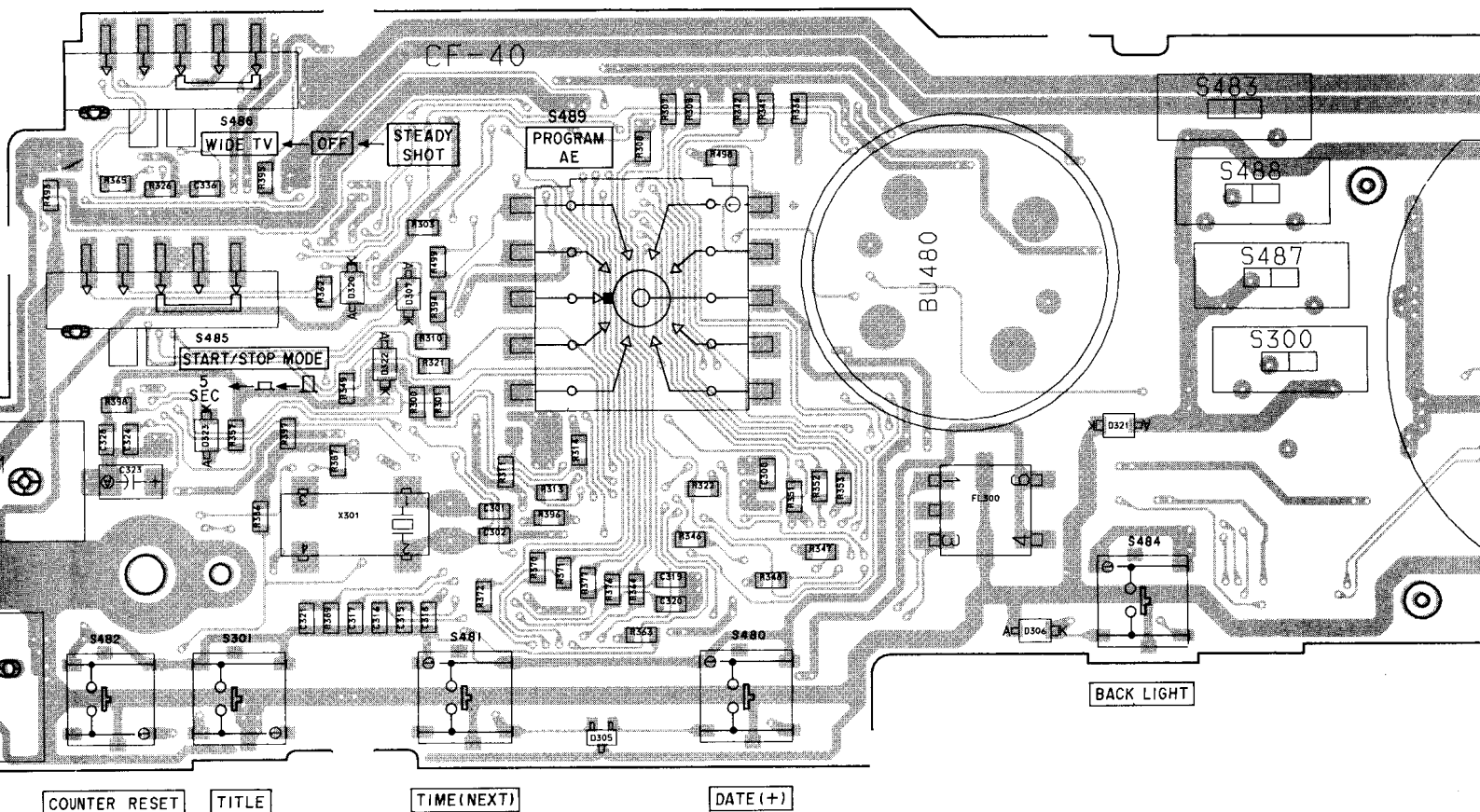
BU480	F-5	D304	B-7	Q305	C-9	R339	A-2	R389	E-3
		D310	A-1	R300	F-3	R340	A-2	R390	B-3
C300	F-4	D312	B-7	R301	F-3	R341	G-4	R392	C-2
C301	E-3	D314	A-5	R303	G-3	R342	G-4	R393	C-2
C302	E-3	D315	A-4	R304	B-6	R343	A-2	R394	F-3
C303	B-3	D316	B-6	R305	F-10	R345	C-5	R395	G-2
C304	B-3	D317	B-5	R306	B-6	R346	E-4	R396	E-3
C305	B-3	D318	B-2	R307	G-4	R350	C-5	R397	F-2
C306	B-5	D321	F-6	R308	G-4	R351	F-4	R398	F-2
C308	B-5	D323	F-2	R309	G-4	R352	F-5	R399	B-3
C310	B-5	D324	D-2	R310	F-3	R353	F-5	R490	C-2
C311	B-5	D325	B-7	R311	F-3	R354	C-5	R494	D-1
C312	C-5	D326	B-7	R312	B-4	R355	C-5	R495	D-1
C313	B-5	D327	E-9	R313	F-3	R356	C-5	R496	C-1
C314	A-4	D328	E-9	R314	F-4	R357	F-2	R497	C-1
C315	E-3	D480	F-10	R315	B-3	R358	C-5	R499	G-3
C316	E-3			R316	B-3	R359	C-8		
C317	E-3	Q301	A-4	R317	B-3	R362	F-2	S300	F-7
C318	E-3	Q302	B-4	R318	B-3	R363	E-4	S301	E-2
C319	E-4	Q303	A-4	R319	B-4	R364	E-4	S480	E-4
C320	E-4	Q304	A-4	R320	B-4	R365	G-2	S481	E-3
C321	E-2			R321	F-3	R370	E-3	S482	E-2
C323	F-2	FL300	F-5	R322	F-4	R371	E-3	S483	G-6
C325	C-2			R323	C-5	R372	E-3	S484	E-6
C326	C-2	HL480	F-8	R324	B-4	R373	C-3	S485	F-2
C327	C-2			R325	B-4	R374	C-3	S486	G-2
C328	F-2	IC301	B-5	R326	G-2	R375	C-3	S487	G-7
C336	G-2	IC302	B-2	R327	A-6	R376	E-4	S488	G-6
		IC303	C-4	R331	A-7	R377	E-4	S489	F-4
CN480	A-3			R332	B-5	R378	C-3		
CN481	C-2	J480	E-1	R333	B-5	R379	C-3	X302	C-3
CN482	C-9			R334	B-5	R380	C-3		
		L300	B-3	R335	B-5	R381	C-3	XTL301	B-3
D300	B-2			R336	G-5	R384	B-3		
D301	D-3	PS301	A-6	R337	A-5	R386	E-2		
D303	B-7			R338	A-4	R387	F-3		



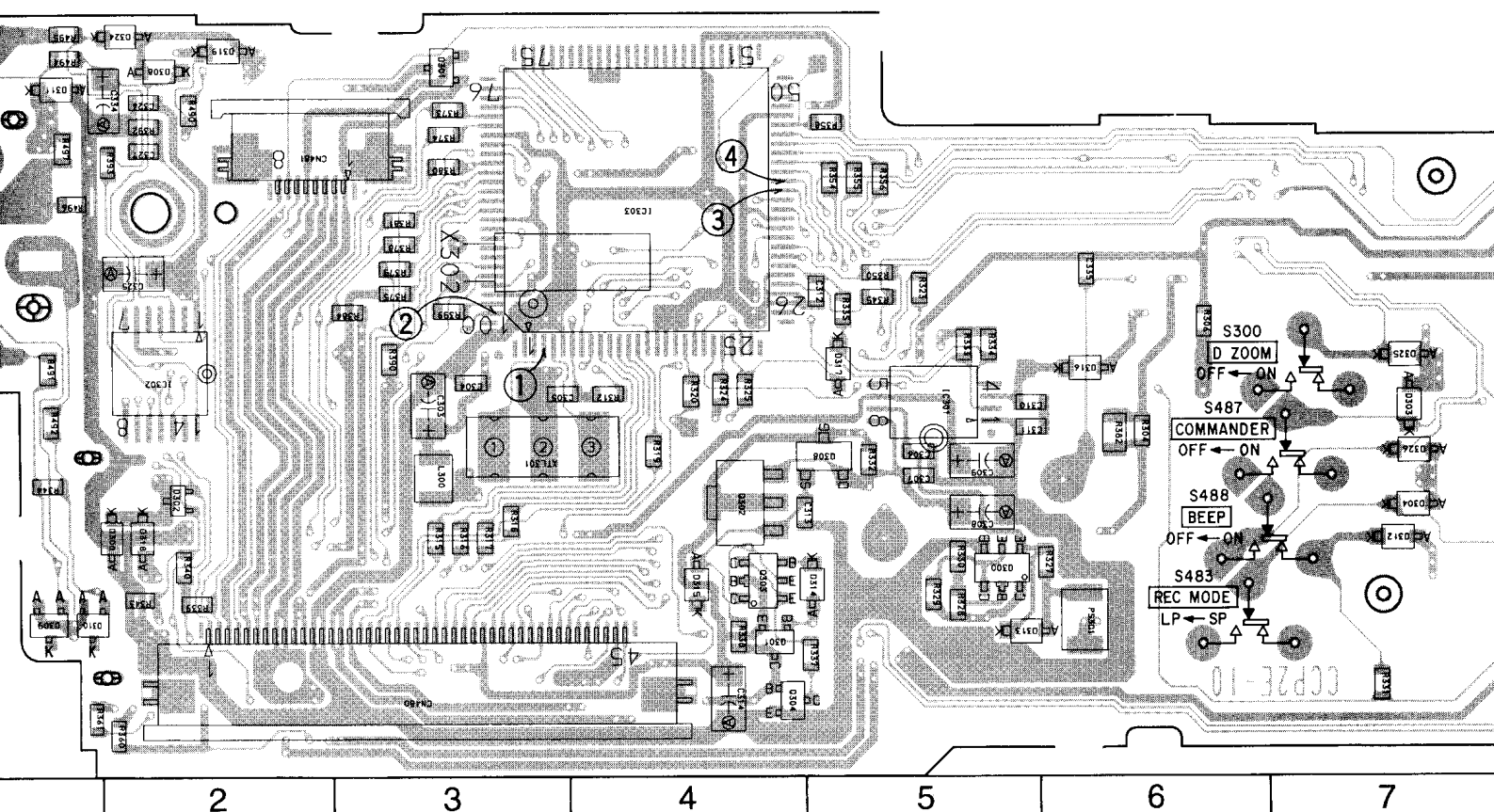


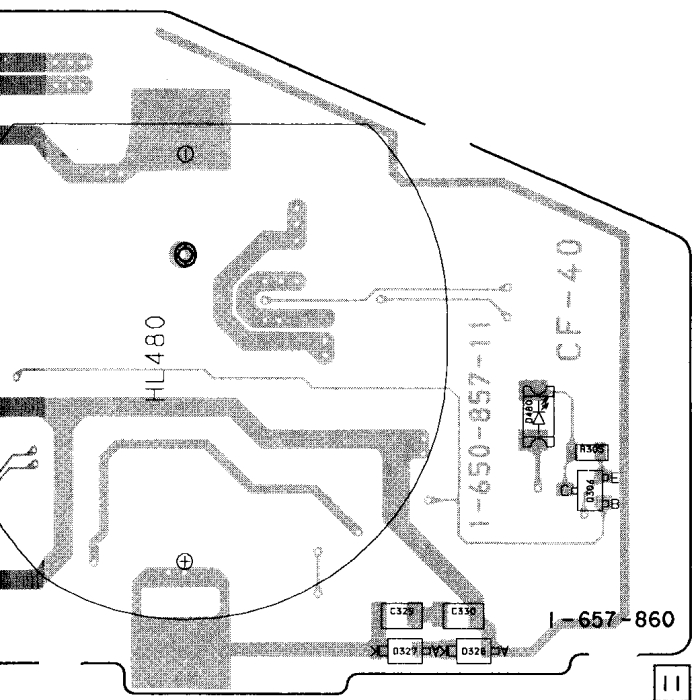
the part printed on this diagram isn't mounted in this model.

## CF-40 BOARD (SIDE A)

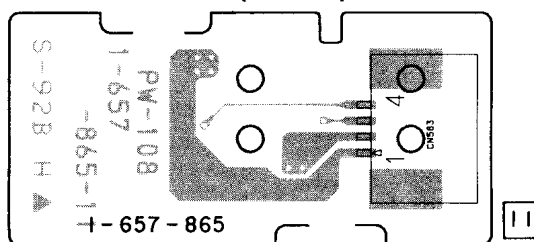


## CF-40 BOARD (SIDE B)

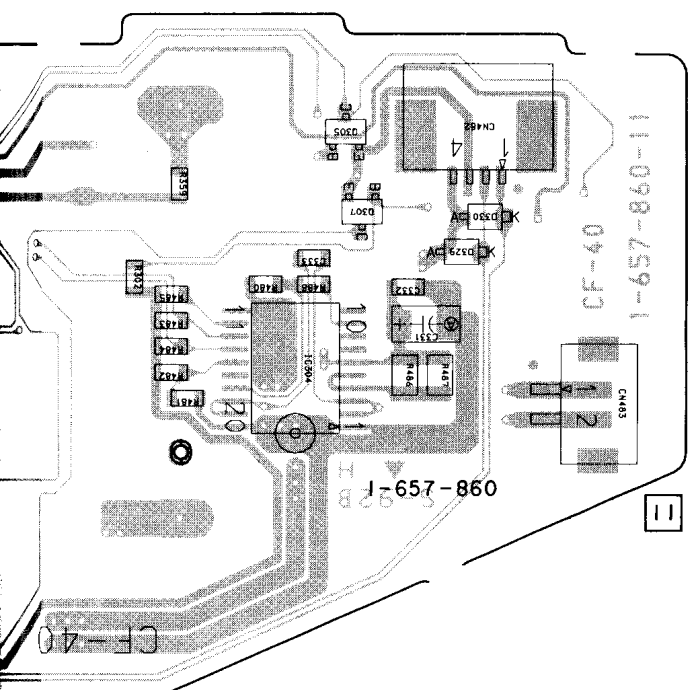
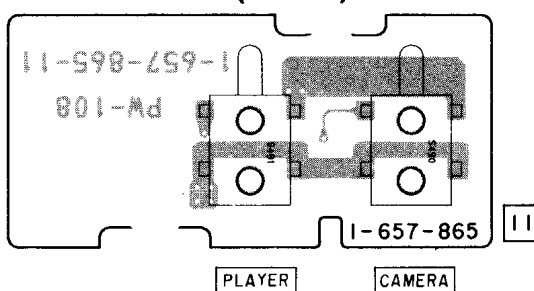




**PW-108 BOARD (SIDE A)**



**PW-108 BOARD (SIDE B)**



8

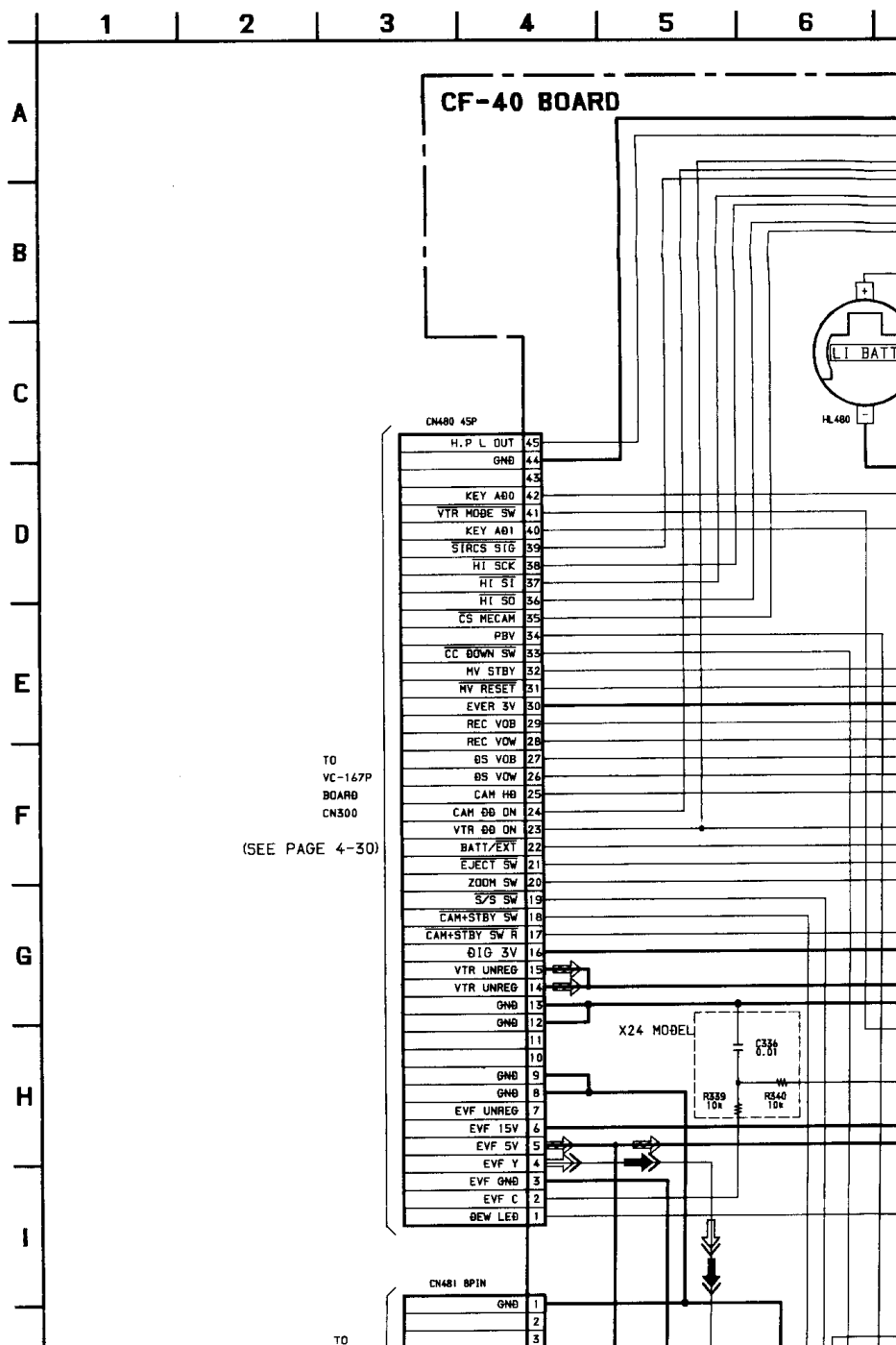
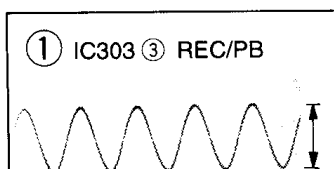
9

10

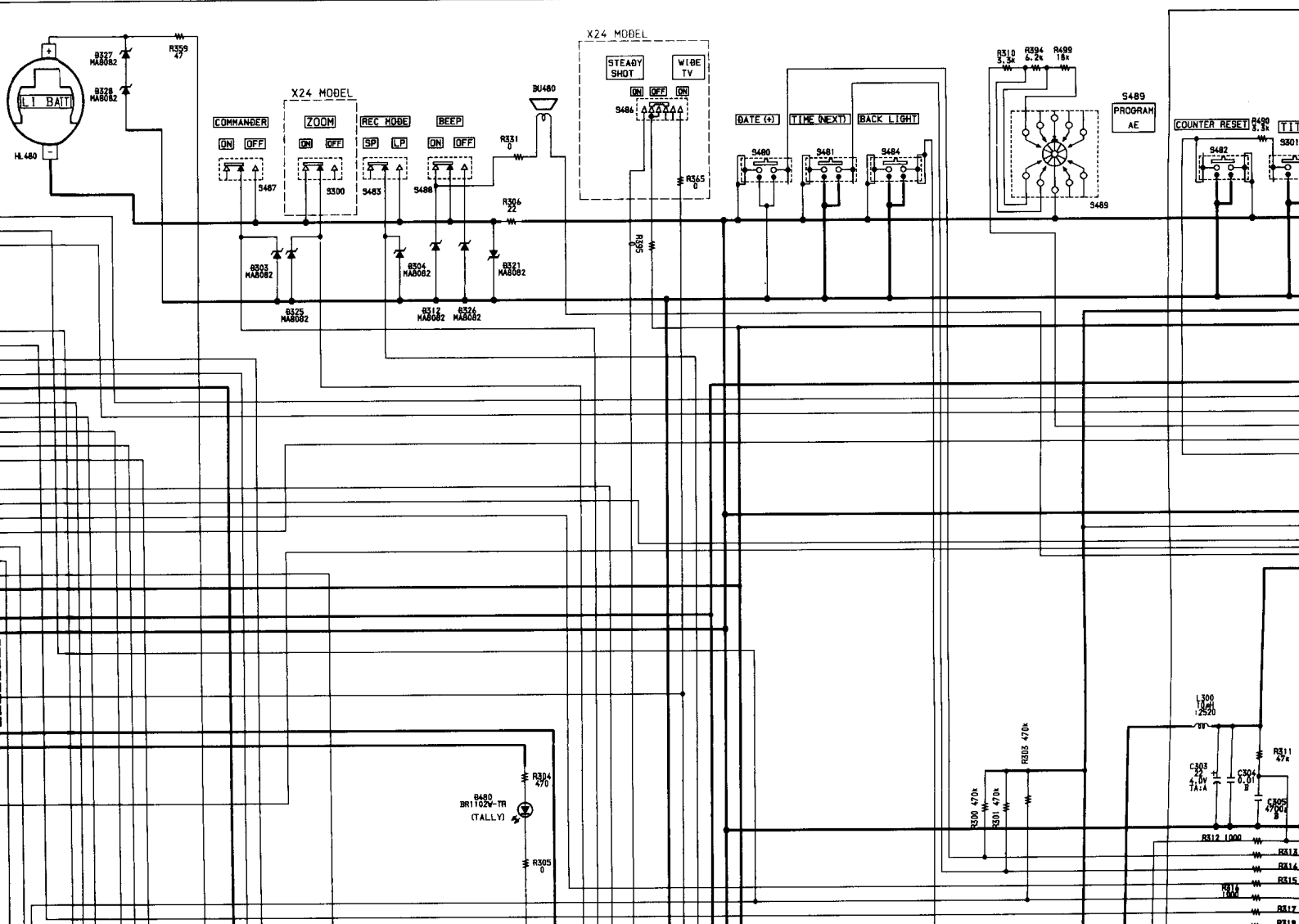
# CF-40 (SYSTEM CONTROL), PW-108 (POWER SWITCH) SCHEMATIC DIA

— Ref. No. CF-40 Board, PW-108 Board; 2,000 Series —

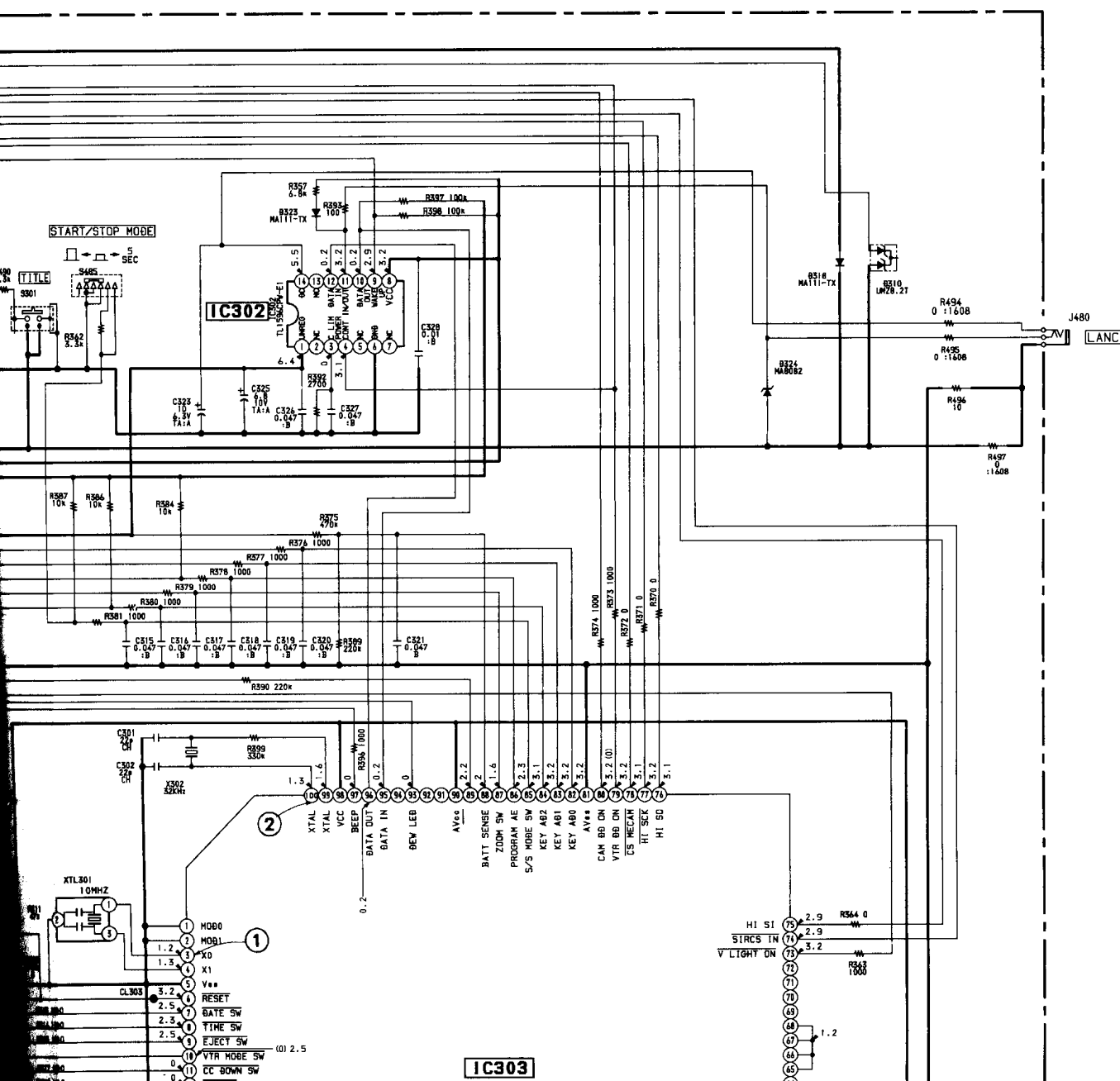
## CF-40 BOARD



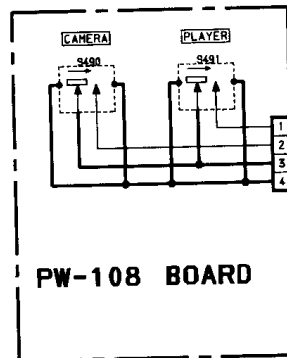
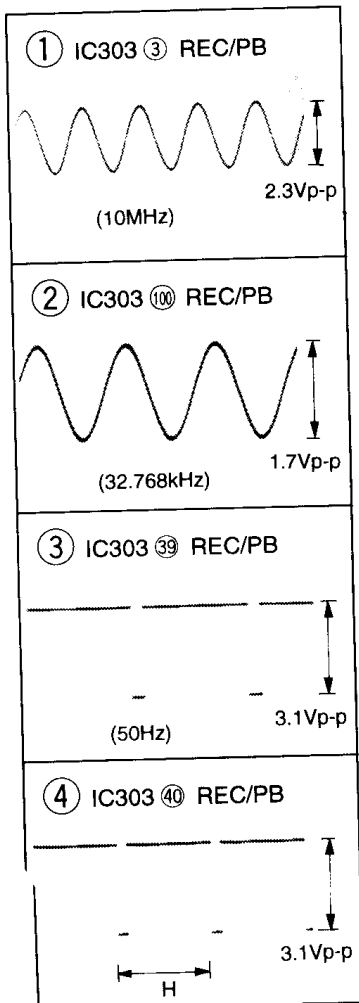
6	7	8	9	10	11	12	13	14	15	16	17
---	---	---	---	----	----	----	----	----	----	----	----







# CF-40 BOARD



no mark: REC or REC/PB  
( ) : PB  
<> : REC (X24 MODEL)

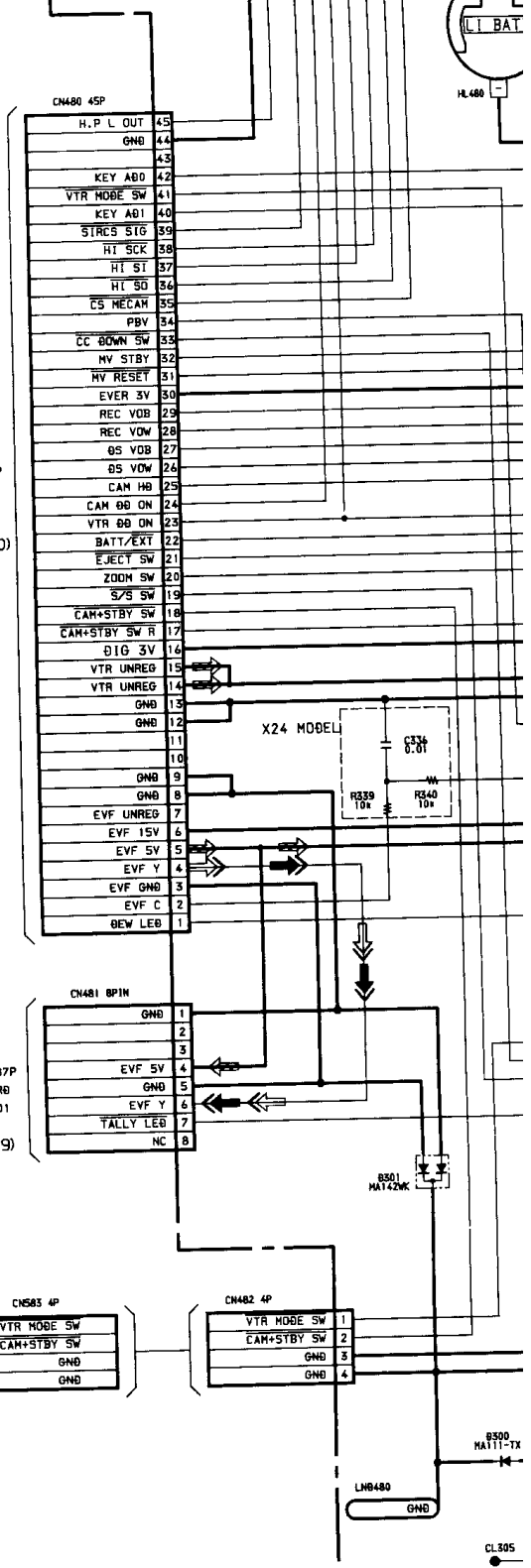
## SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	→	→		
PB	→	→		

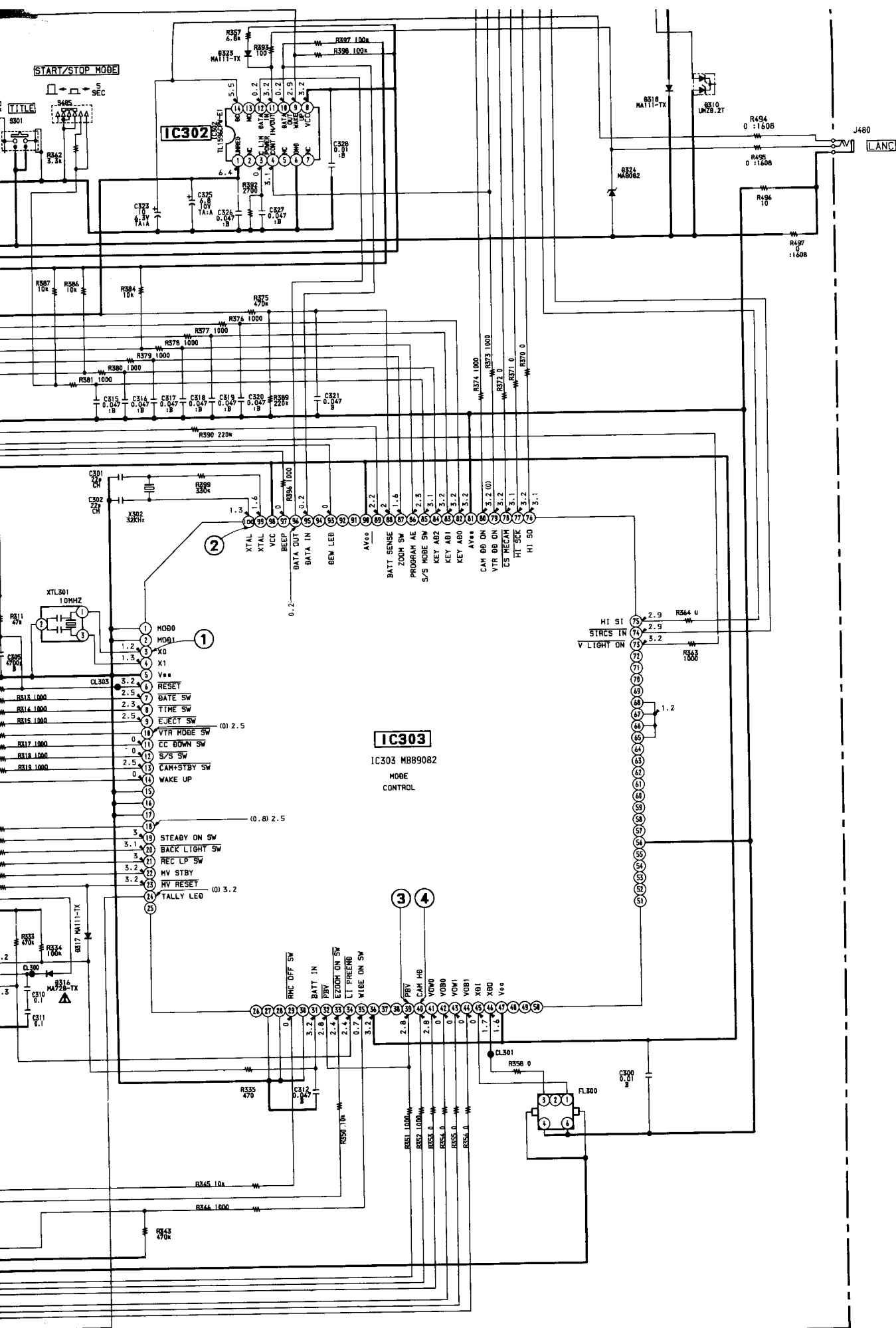
Note:  
The components identified by mark **▲** or dotted line with mark **▲** are critical for safety.  
Replace only with part number specified.

TO  
VC-167P  
BOARD  
CN300  
(SEE PAGE 4-30)

TO  
VF-87P  
BOARD  
CN901  
(SEE PAGE 4-49)





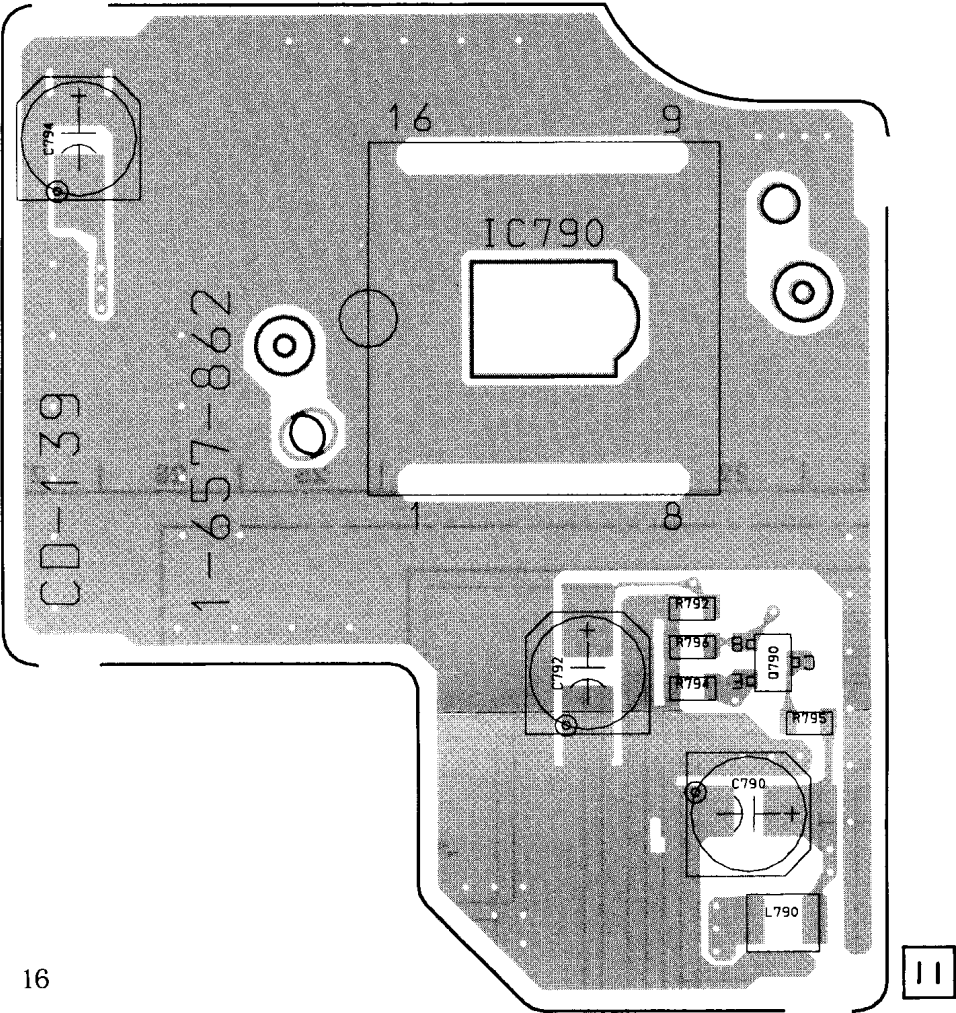


**VF-87P (EVF), JK-129 (JACK), CD-139 (CCD IMAGER) PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM**

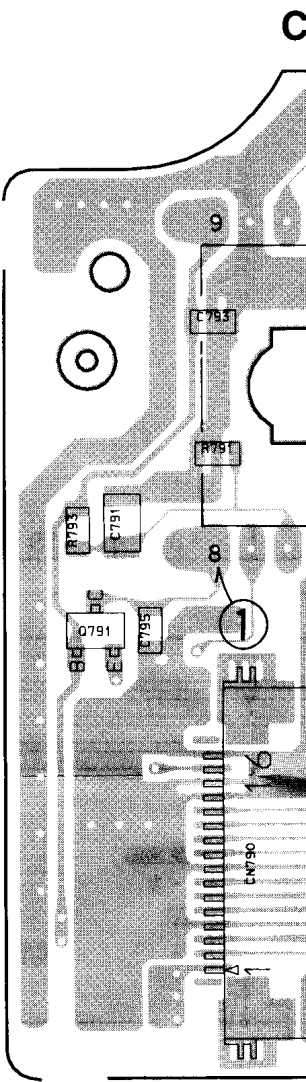
— Ref. No. VF-87P Board, JK-129 Board, CD-139 Board; 2,000 Series —

- See page 4-18 for JK-129 BOARD printed wiring board.

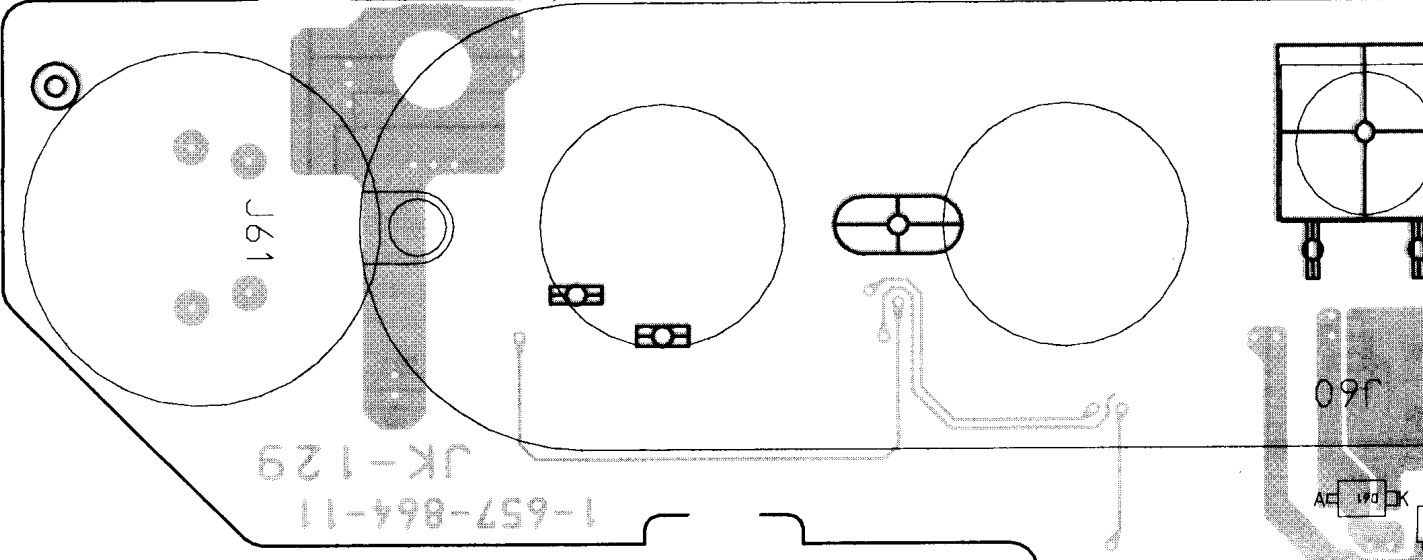
**CD-139 BOARD (SIDE A)**



16

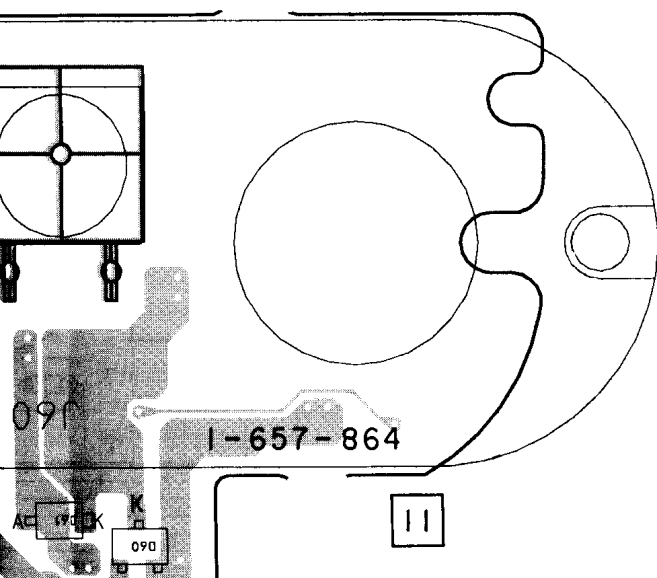
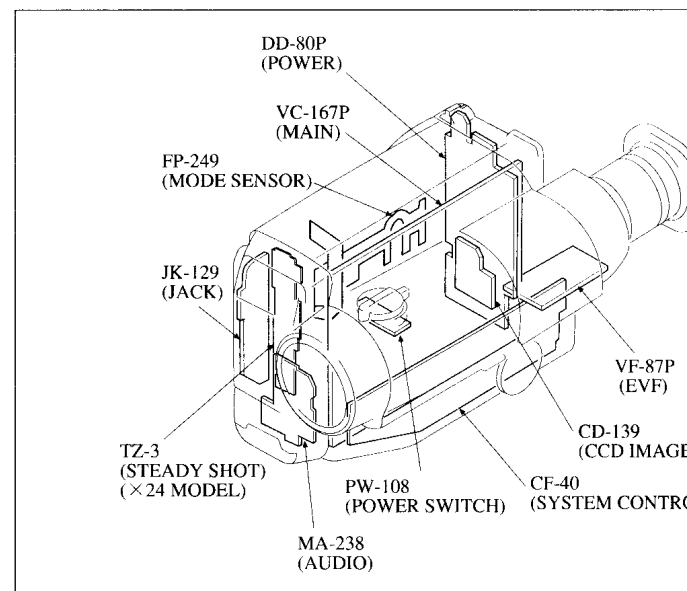
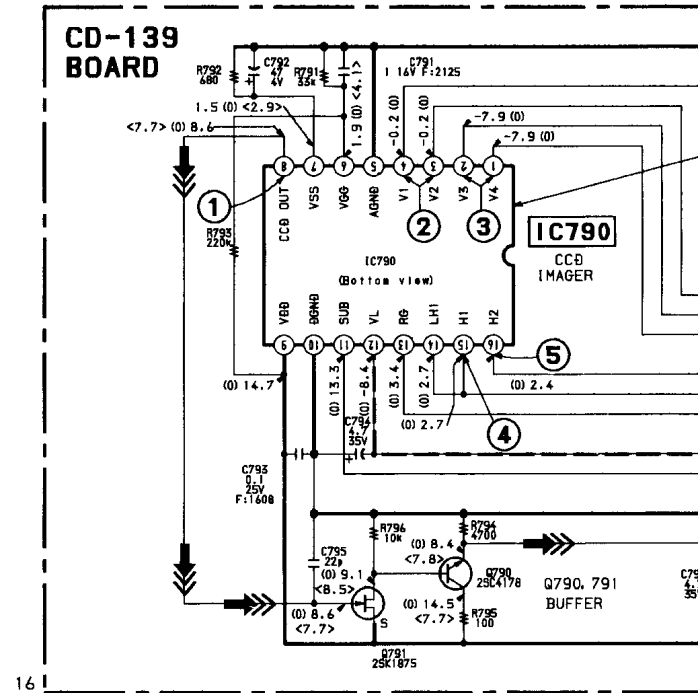
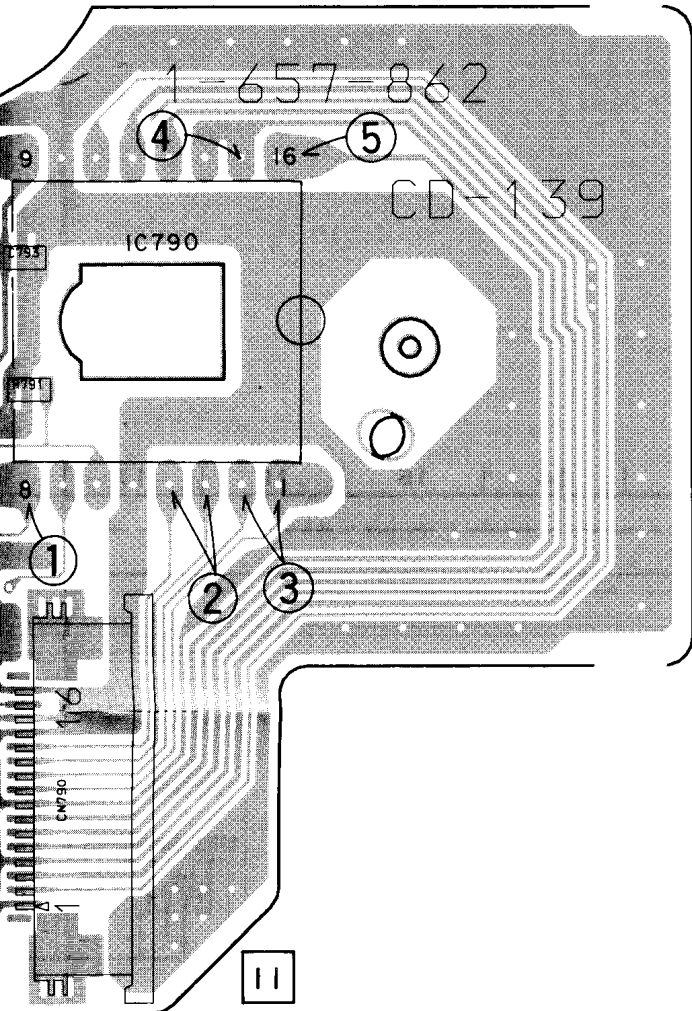


**JK-129 BOARD (SIDE A)**

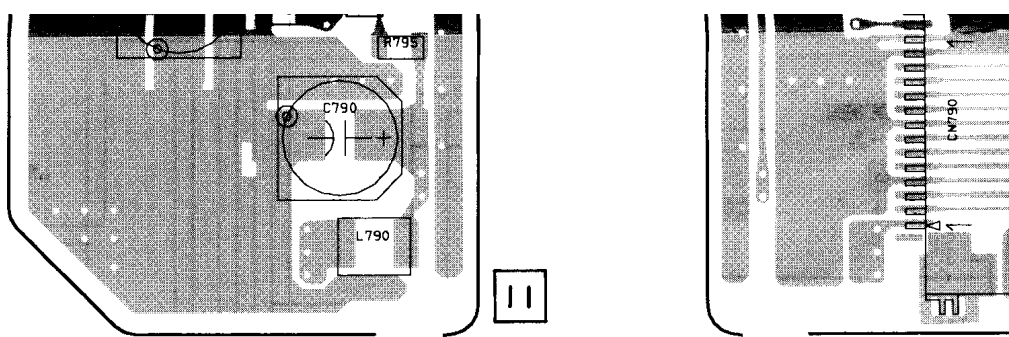


There are few cases that the part printed on this diagram isn't mounted in this model.

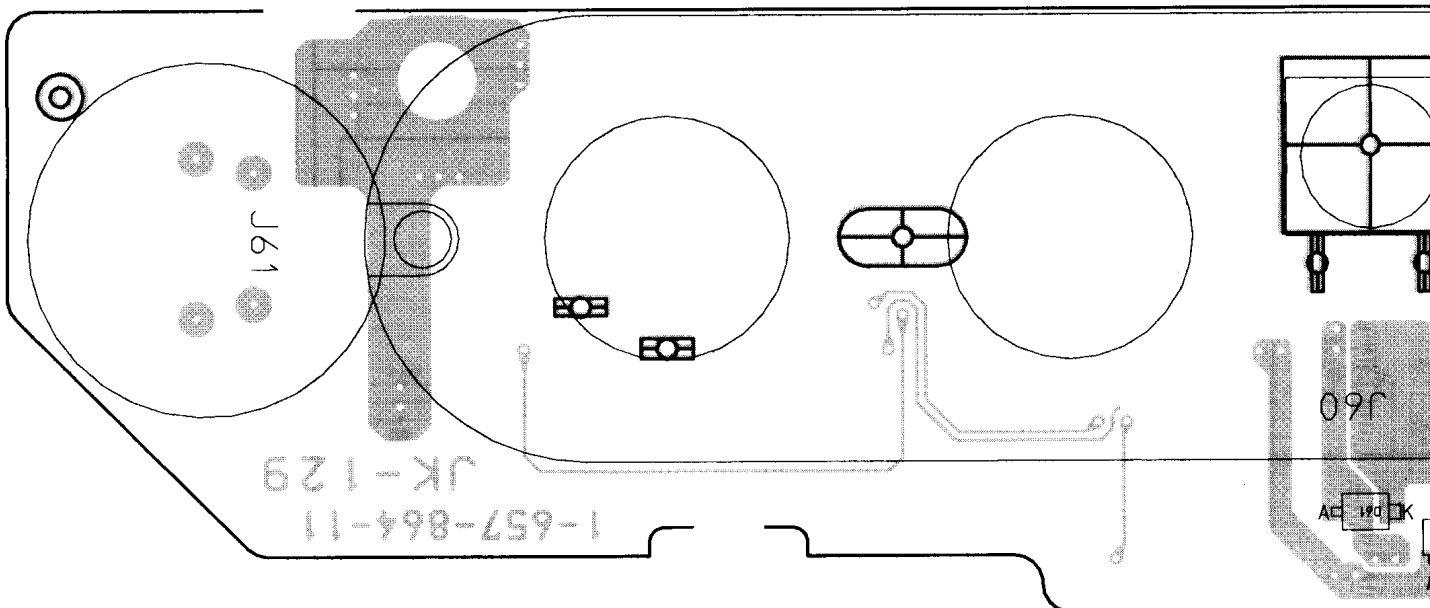
## CD-139 BOARD (SIDE B)



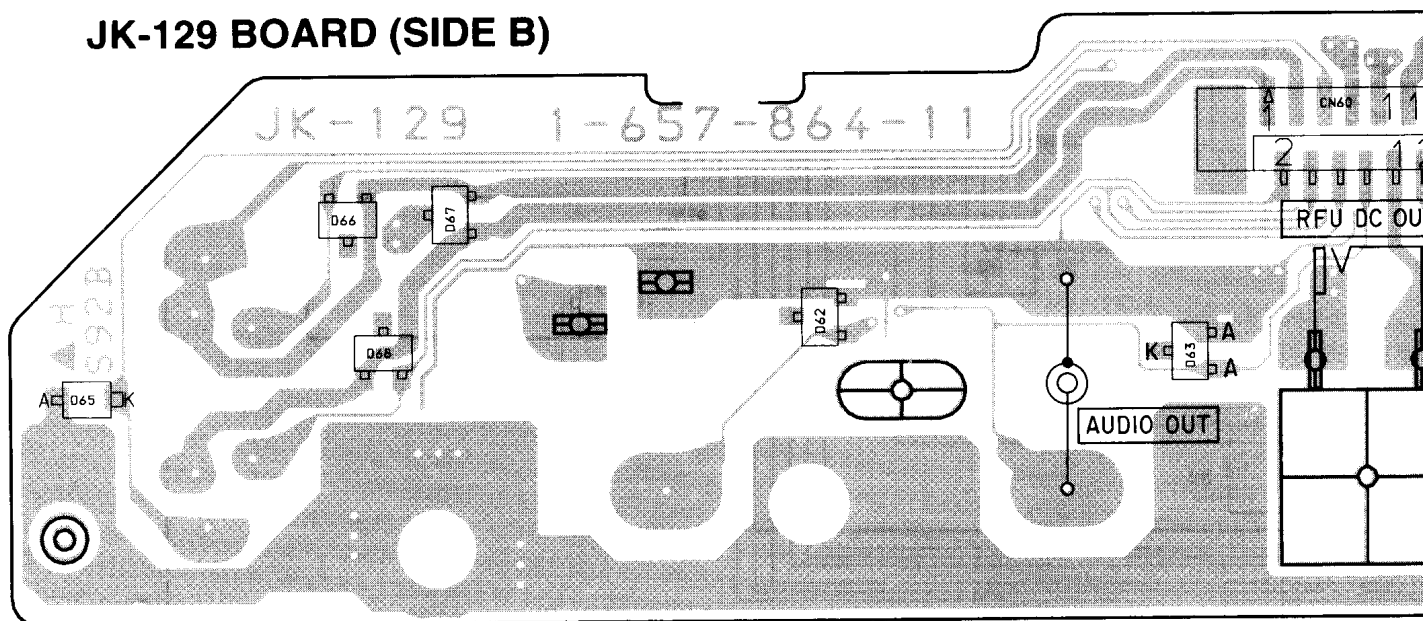




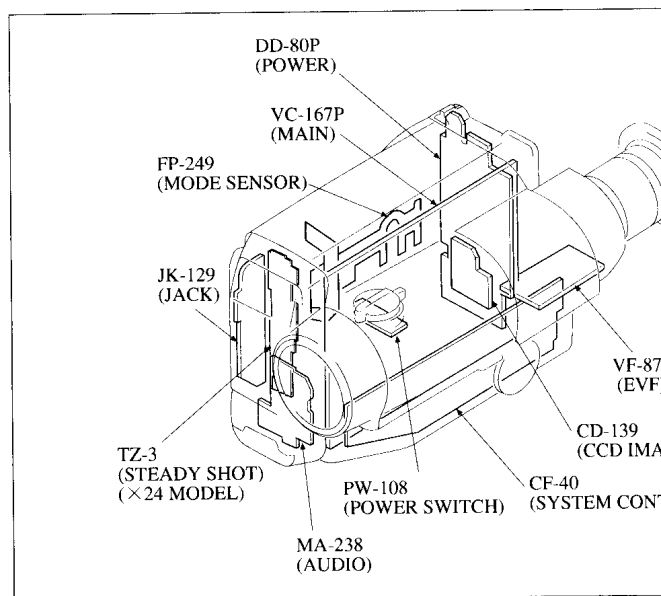
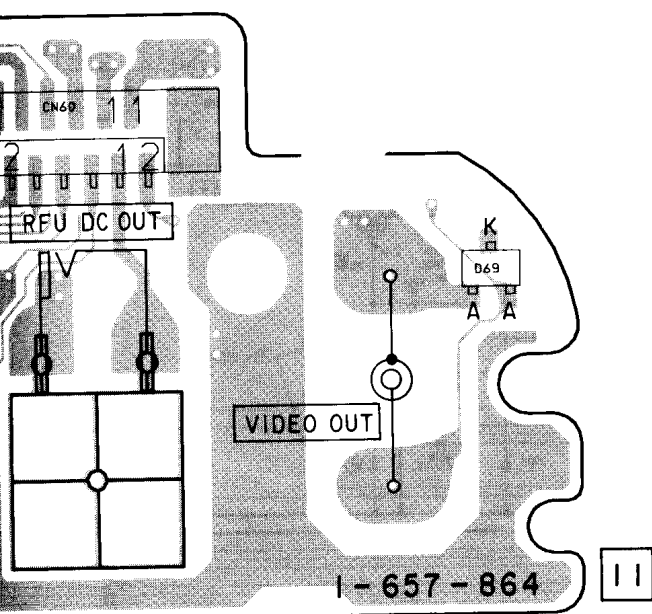
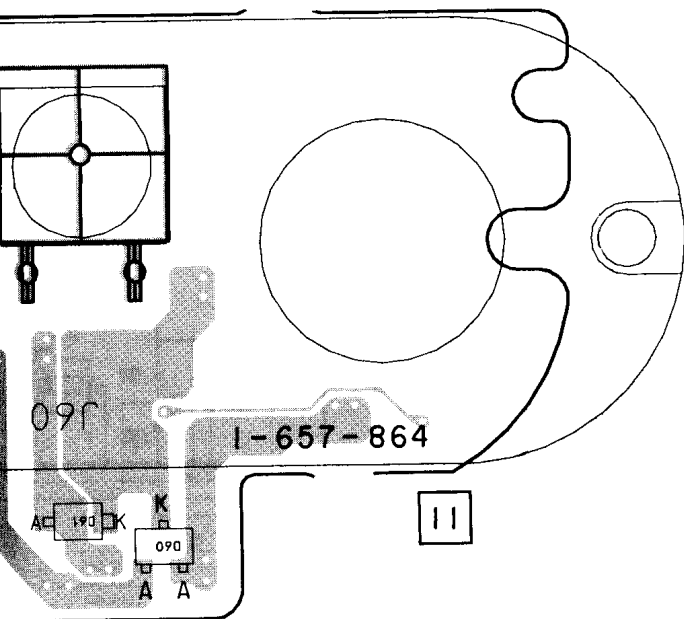
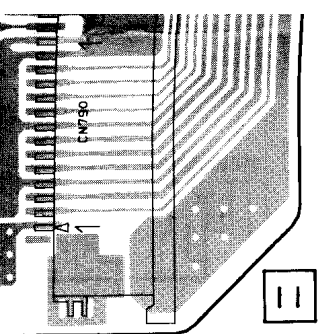
## JK-129 BOARD (SIDE A)



## JK-129 BOARD (SIDE B)





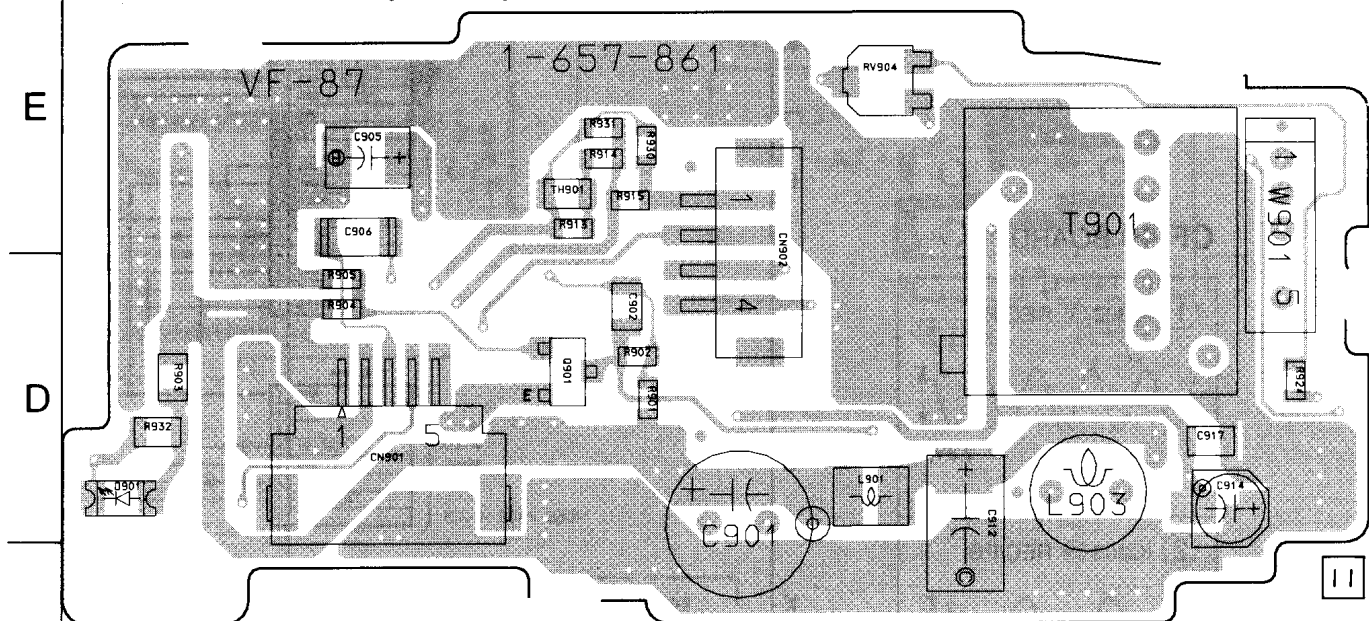


J60

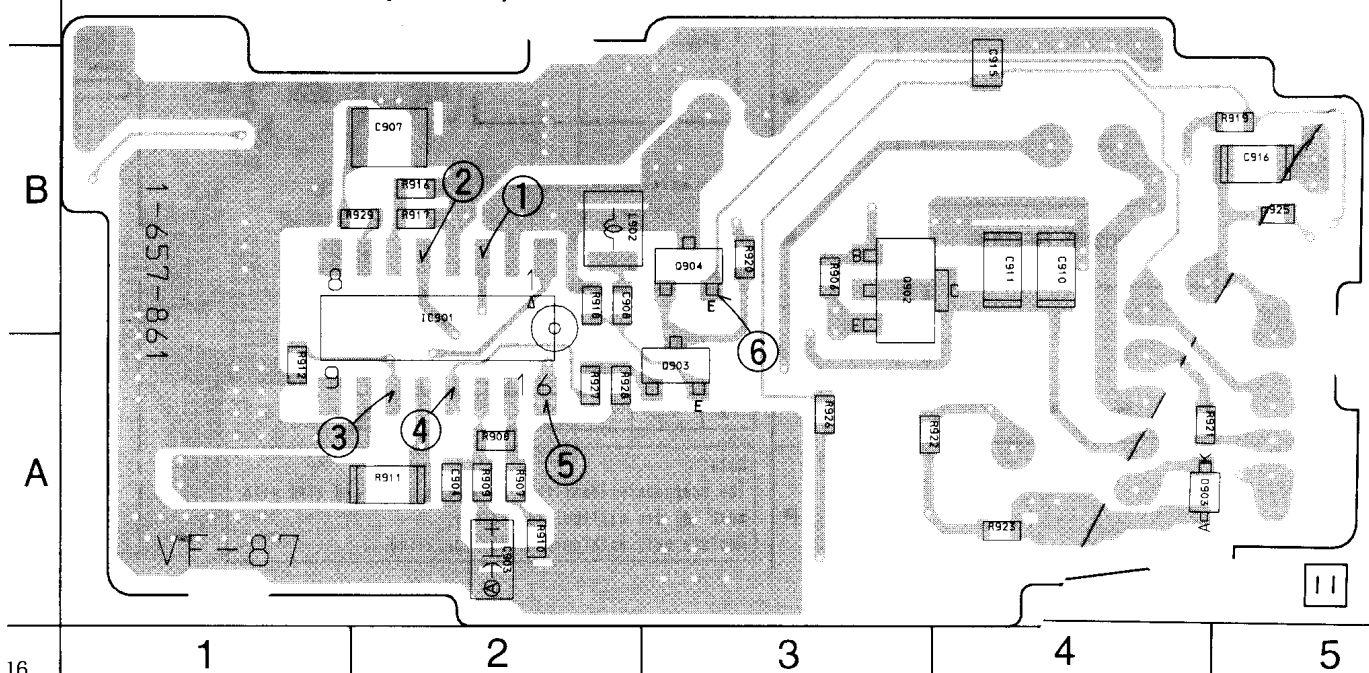
# VF-87P BOARD

C901	D-3	D901	D-1	R908	A-2	R926	A-3
C902	D-2	D903	A-4	R909	A-2	R927	A-2
C903	A-2			R910	A-2	R928	A-2
C904	A-2	IC901	B-2	R911	A-2	R929	B-2
C905	E-2			R912	A-1	R930	E-3
C906	E-2	L901	D-3	R913	E-2	R931	E-2
C907	B-2	L902	B-2	R914	E-2		
C908	B-2	L903	D-4	R915	E-2	RV904	E-3
C910	B-4			R916	B-2		
C911	B-4	Q902	B-3	R917	B-2	T901	E-4
C912	D-4	Q903	A-3	R918	B-2		
C914	D-4	Q904	B-3	R919	B-5	TH901	E-2
C915	B-4			R920	B-3		
C916	B-5	R901	D-3	R921	A-4	W901	E-5
C917	D-4	R902	D-2	R922	A-3		
		R903	D-1	R923	A-4		
CN901	D-2	R906	B-3	R924	D-5		
CN902	E-3	R907	A-2	R925	B-5		

## VF-87P BOARD (SIDE A)

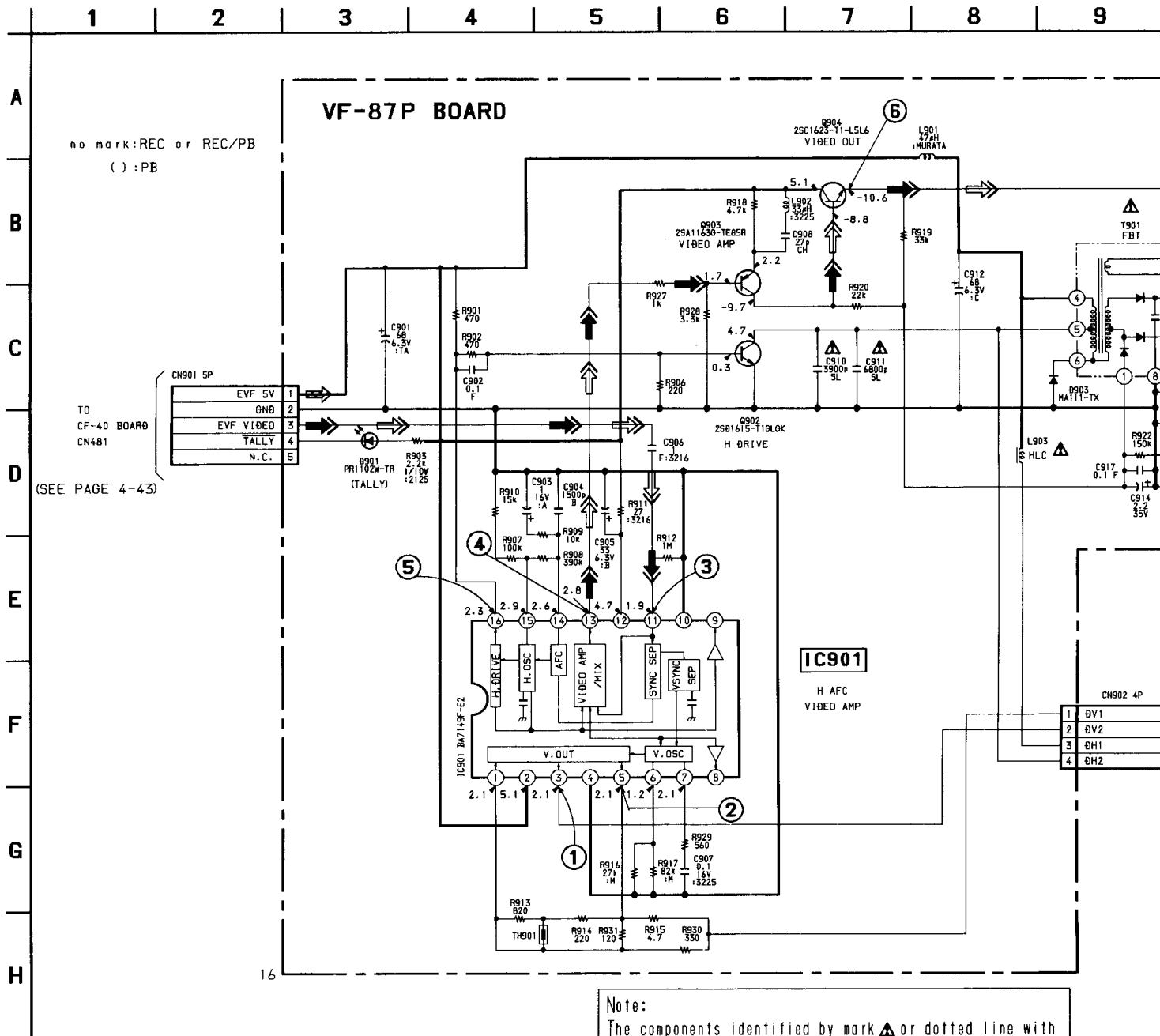


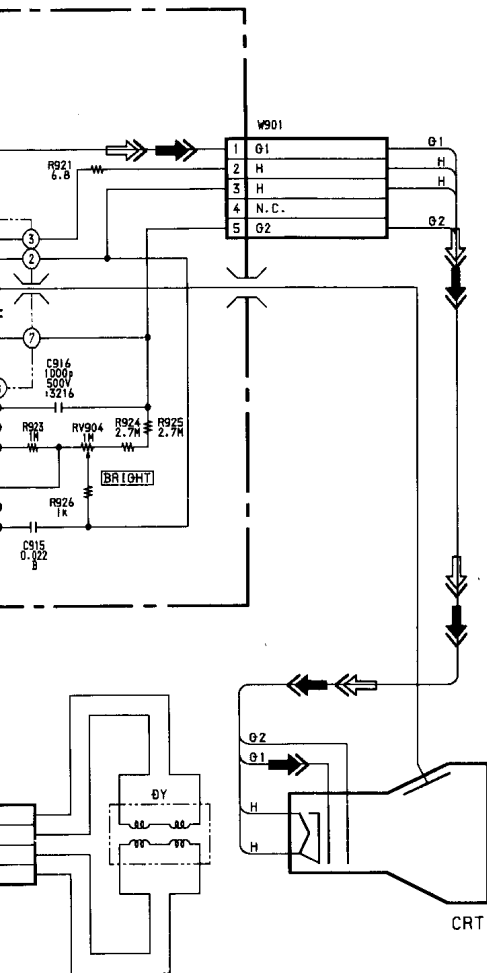
## VF-87P BOARD (SIDE B)



# VF-87P (EVF) SCHEMATIC DIAGRAM

— Ref. No. VF-87P Board; 2,000 Series —

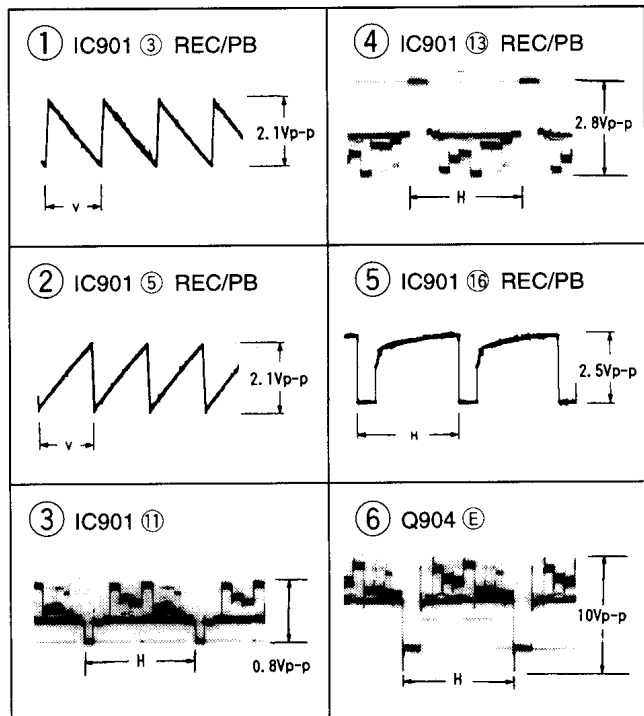




•SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC		➡➡		
PB		➡➡		

VF-87P BOARD



(×24 MODEL)

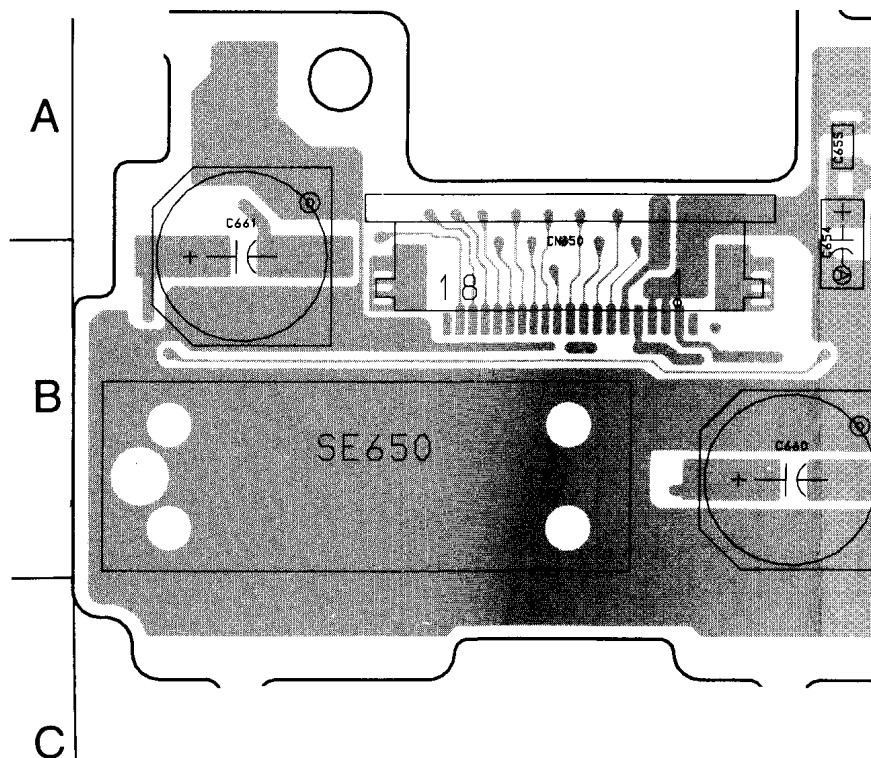
# TZ-3 (STEADY SHOT) PRINTED WIRING BOARD

— Ref. No. : TZ-3 Board; 5,000 Series —

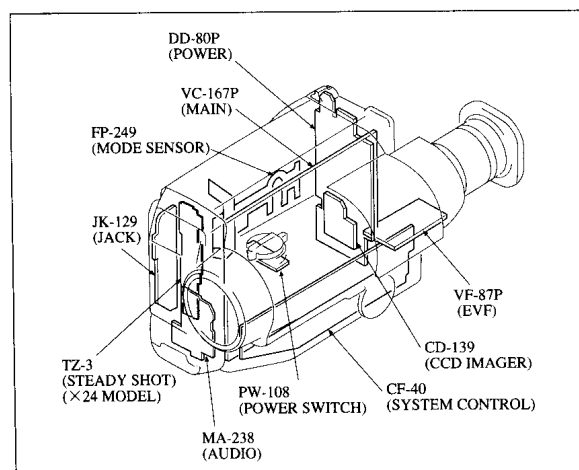
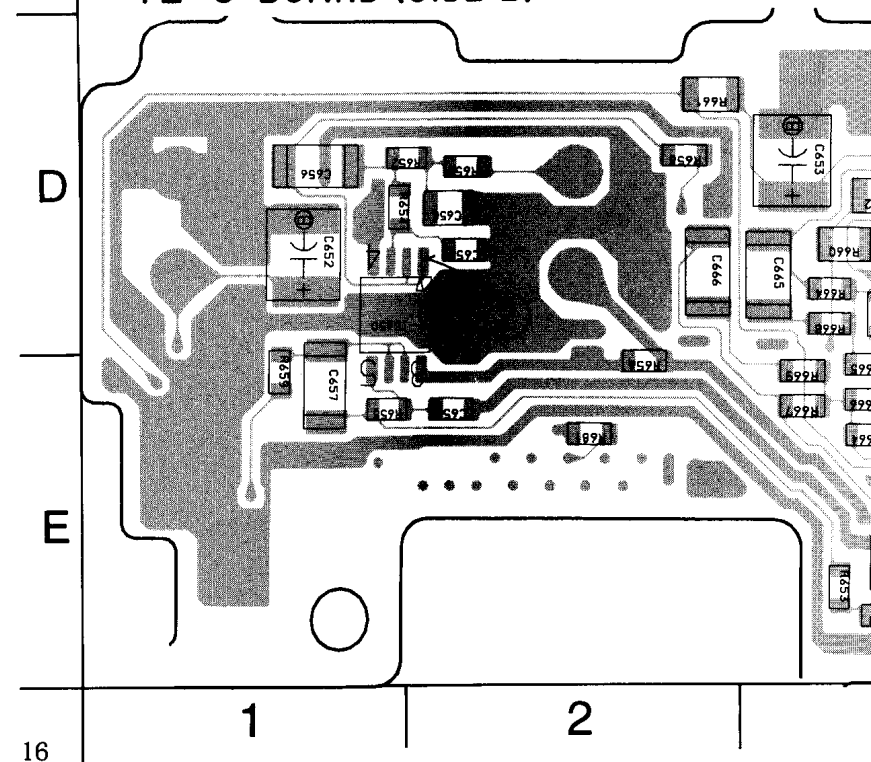
## TZ-3 BOARD

C650 D-2	IC650 D-1	R665 D-3
C651 E-3	IC651 D-3	R666 E-3
C652 D-1	IC652 D-3	R667 D-3
C653 D-3	IC653 D-4	R668 D-3
C654 A-3	IC654 D-5	R669 D-3
C655 A-3	IC655 B-6	R670 E-4
C656 D-1		R671 B-5
C657 E-1	L650 E-4	R672 D-6
C658 D-2	L651 E-5	R673 D-6
C659 E-2	L652 D-5	R674 B-6
C660 B-3		R675 D-6
C661 A-1	Q650 E-4	R676 B-6
C663 D-3		R679 E-4
C664 E-3	R650 D-2	R681 E-2
C665 D-2	R651 E-3	R683 D-6
C666 D-2	R652 D-1	R685 D-6
C667 D-5	R653 E-3	
C668 E-4	R654 D-1	SE650 B-2
C669 D-5	R655 E-1	SE651 B-3
C670 D-5	R656 E-2	
C671 E-5	R658 D-2	X650 B-6
C672 D-6	R659 E-1	
C673 D-6	R660 D-3	
C674 D-6	R661 D-2	
C675 D-6	R662 D-3	
	R663 E-3	
CN650 B-2	R664 D-3	

## TZ-3 BOARD (SIDE A)



## TZ-3 BOARD (SIDE B)

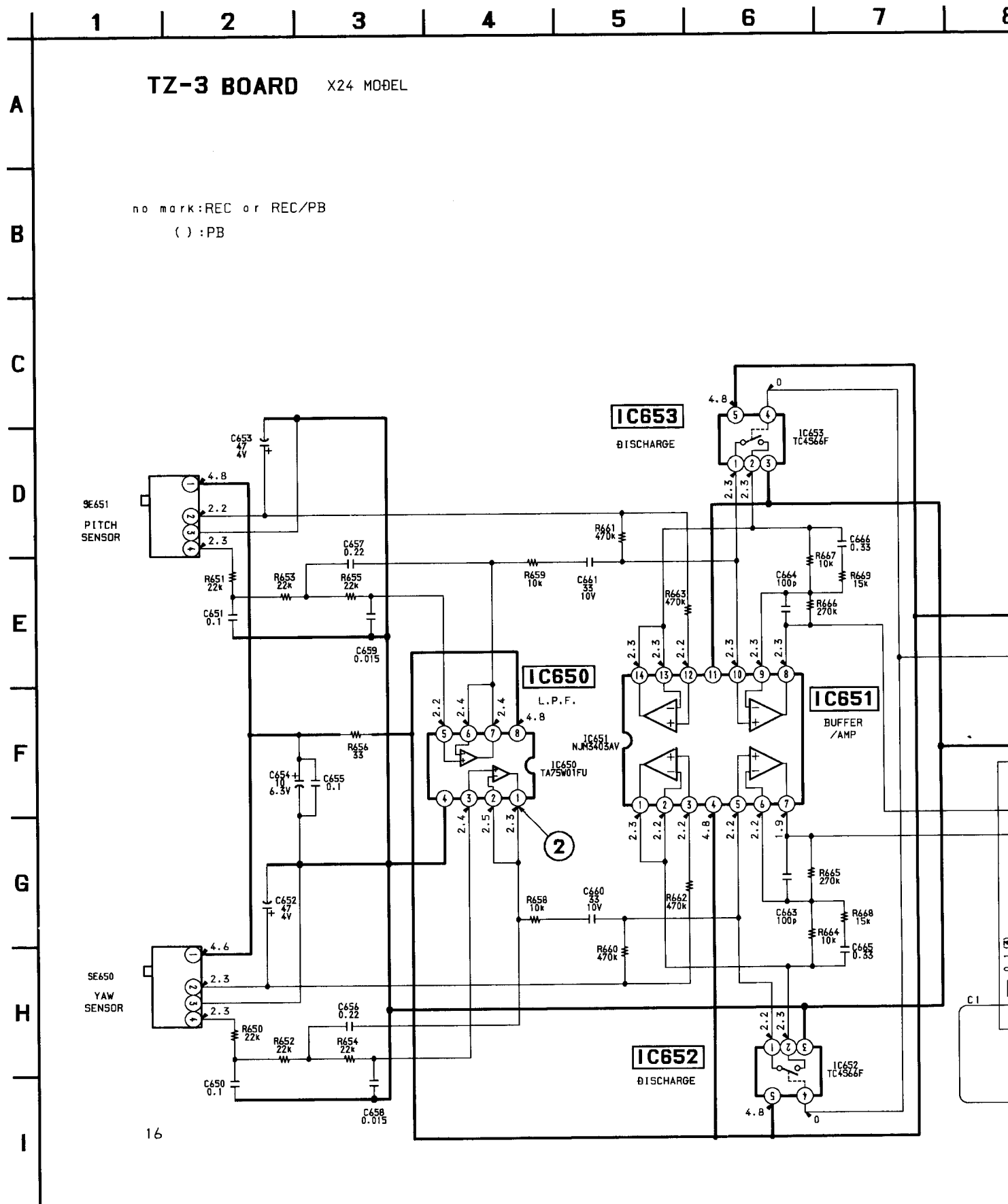


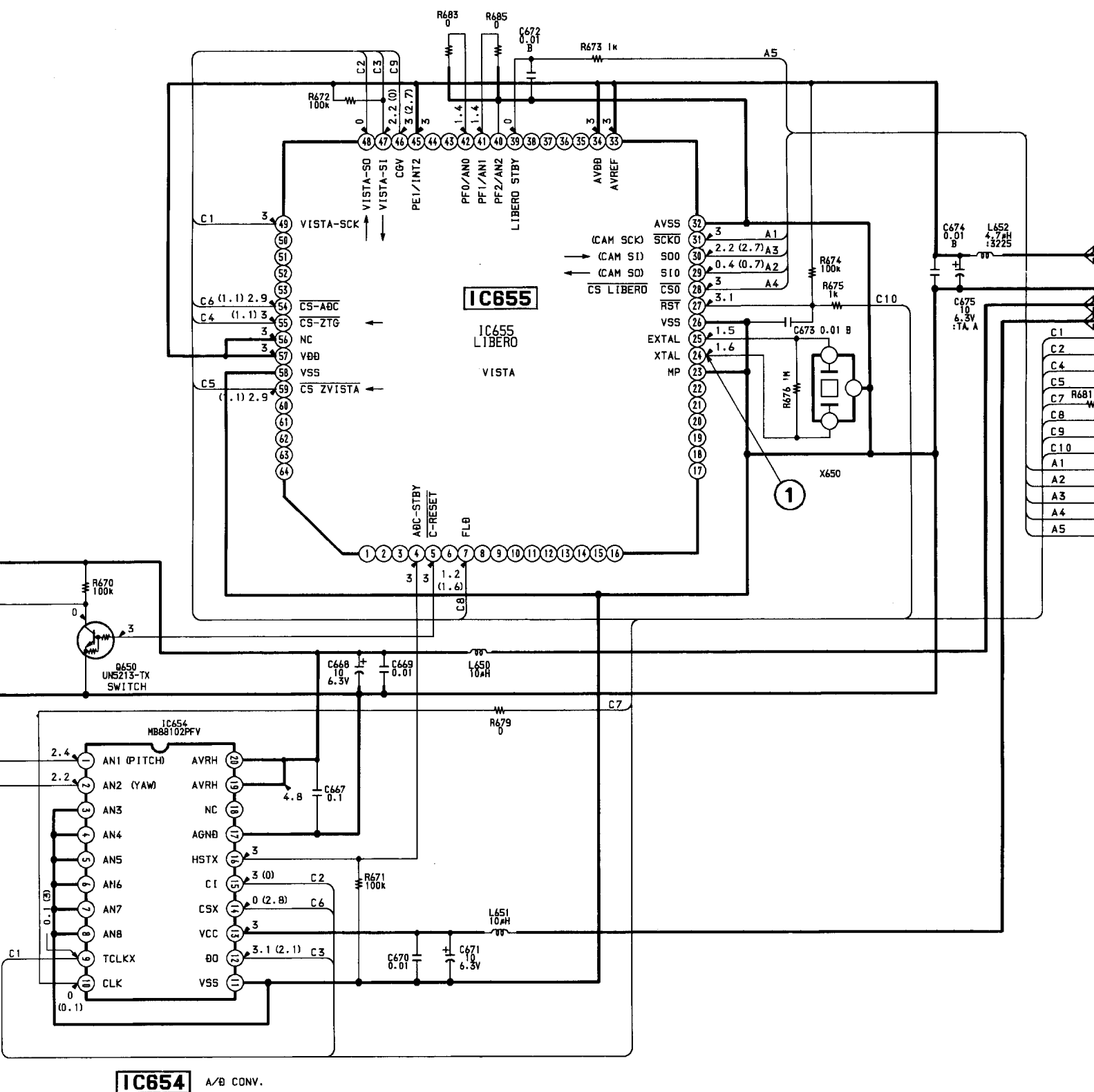


(×24 MODEL)

# TZ-3 (STEADY SHOT) SCHEMATIC DIAGRAM

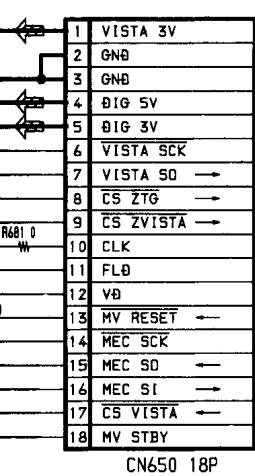
— Ref. No. :TZ-3 Board; 5,000 Series —





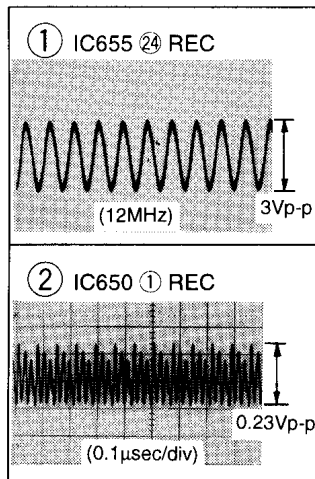


16 | 17 | 18



T0  
 VC-167P  
 BOARD  
 CN702  
 (SEE PAGE 4-7)

## TZ-3 BOARD



## SECTION 5

### REPAIR PARTS LIST

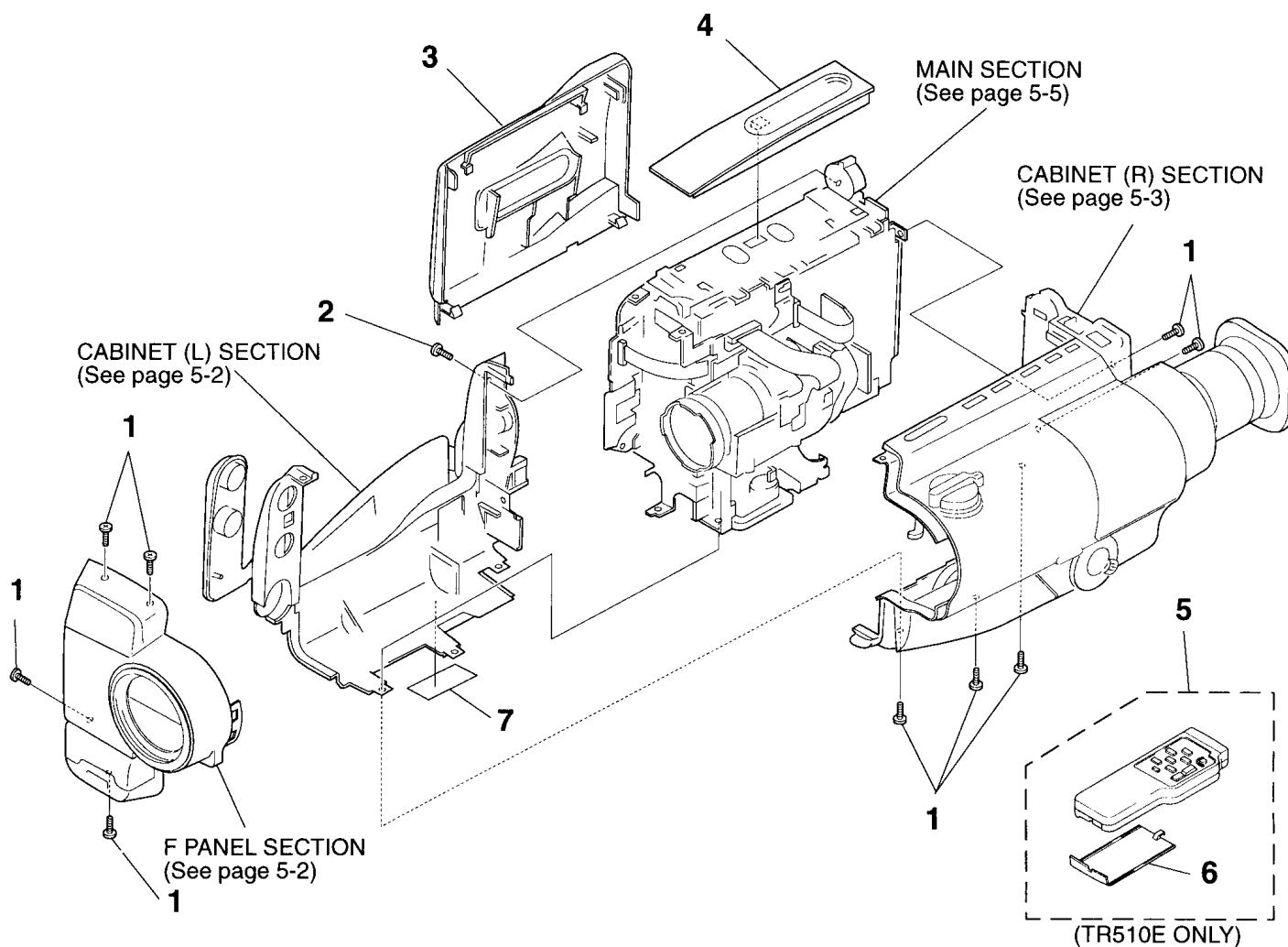
#### 5-1. EXPLODED VIEWS

##### NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

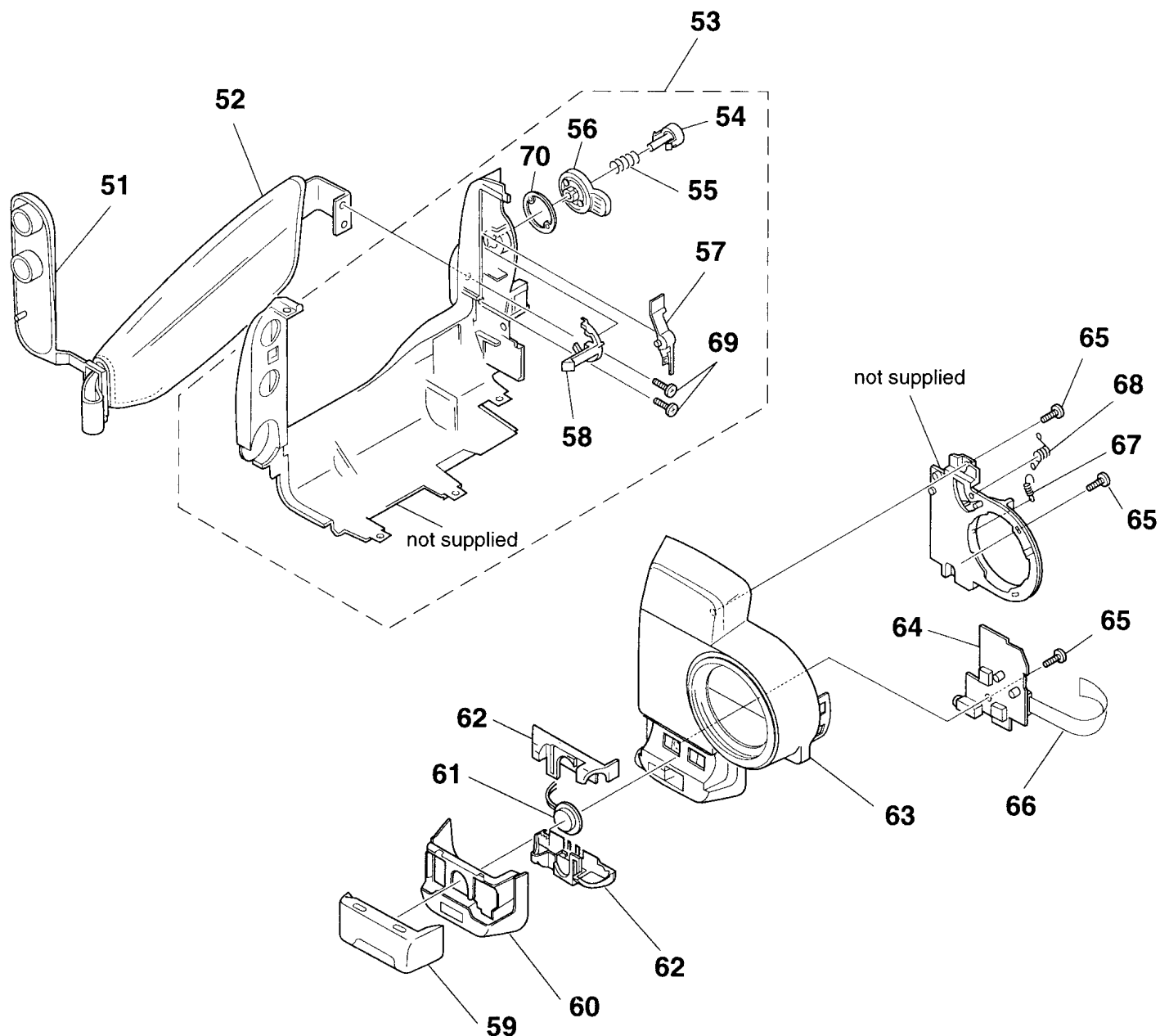
The components identified by mark or dotted line with mark are critical for safety. Replace only with part number specified.

##### 5-1-1. OVERALL SECTION



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
1	3-962-826-01	SCREW (2X4)		4	3-965-896-01	LID, LS	
2	3-713-786-21	SCREW (M2X3)		5	1-473-342-11	REMOTE COMMANDER (RMT-713) (TR510E)	
3	X-3945-446-1	LID ASSY, CASSETTE (TR330E)		6	3-958-131-01	COVER, BATTERY, REMOCON (TR510E)	
3	X-3945-446-2	LID ASSY, CASSETTE (TR510E)		7	3-704-235-01	LABEL, CAUTION (TR330E:UK)	

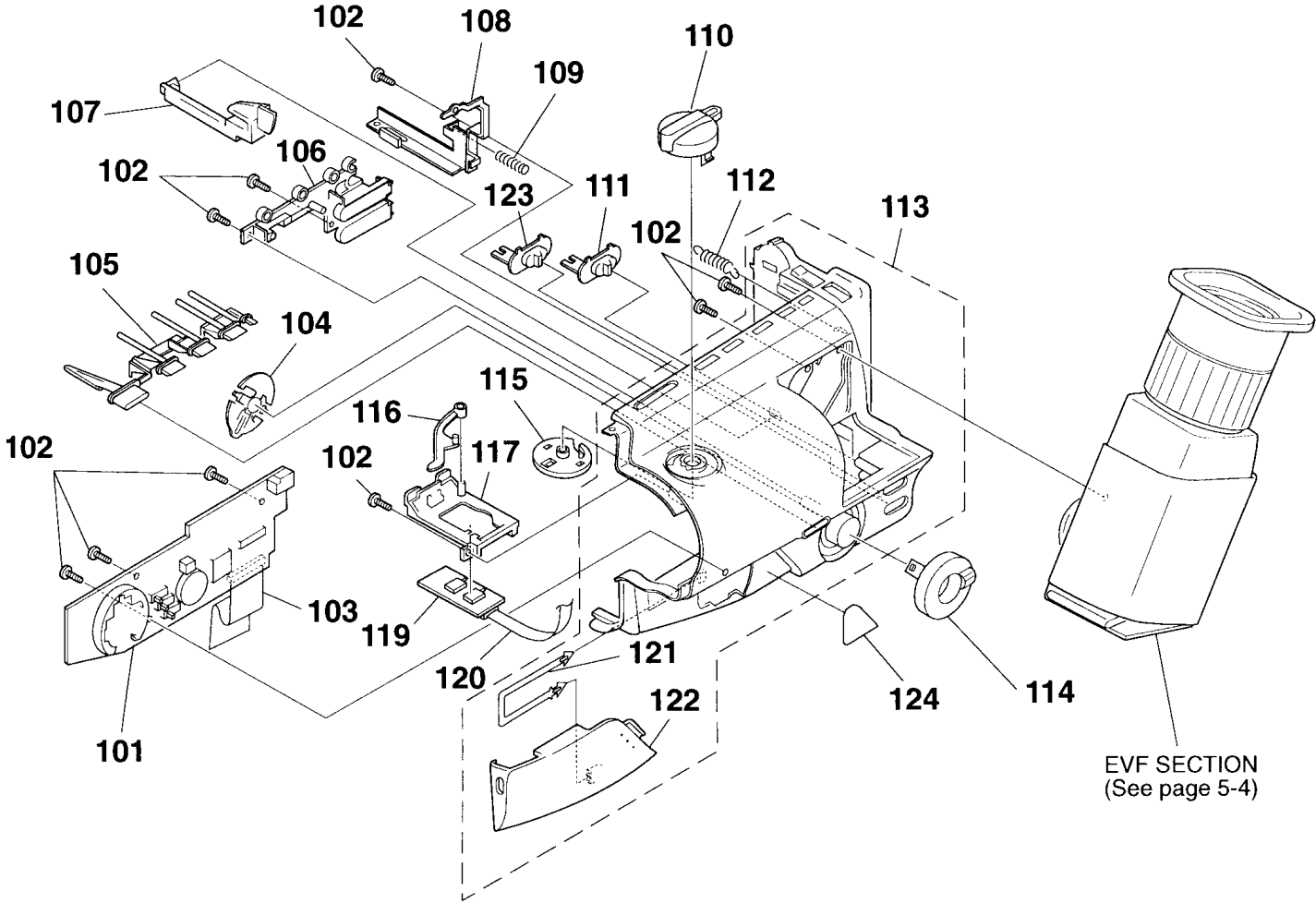
## 5-1-2. CABINET (L), F PANEL SECTION



Ref. No.	Part No.	Description	Remarks
51	3-965-888-01	COVER, JACK	
52	3-736-807-01	BELT, GRIP	
53	X-3945-455-1	CABINET (L) ASSY (TR330E)	
53	X-3945-455-3	CABINET (L) ASSY (TR510E)	
54	3-965-844-01	BUTTON, S/S	
55	3-965-830-01	SPRING, COMPRESSION	
56	3-942-985-01	KNOB, STAND-BY	
57	3-965-870-01	PLATE, S/S JOINT	
58	3-965-869-01	HOLDER, KNOB	
59	3-965-860-01	GRILLE (M), MICROPHONE	
60	X-3945-449-1	COVER ASSY, MICROPHONE	

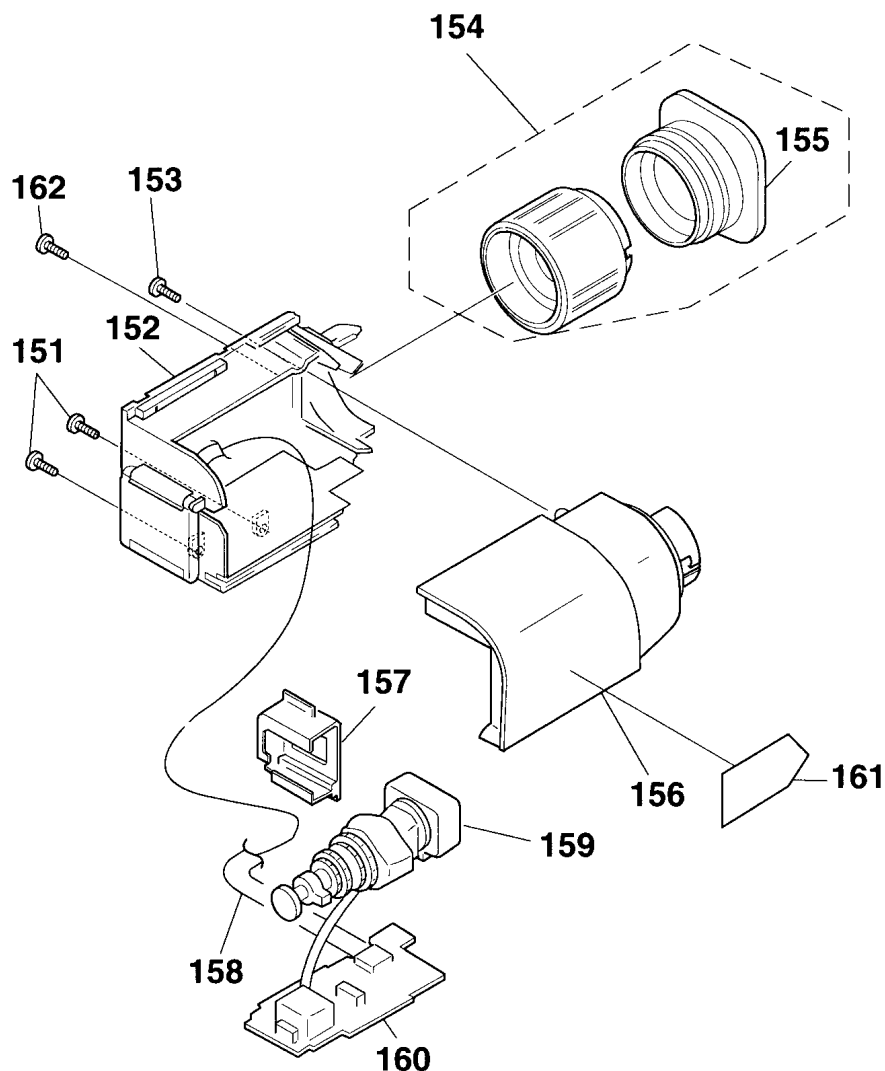
Ref. No.	Part No.	Description	Remarks
61	1-542-259-11	MICROPHONE, CAP	
62	3-965-861-01	HOLDER, MICROPHONE	
63	X-3945-450-1	PANEL ASSY, F (TR330E)	
63	X-3945-592-1	PANEL ASSY, F (TR510E)	
64	A-7072-358-A	MA-238 BOARD, COMPLETE	
65	3-719-601-01	SCREW (B2X5), TAPPING	
66	1-775-517-11	CABLE, FLEXIBLE FLAT 8P	
67	3-307-378-11	SPRING, TENSION	
68	3-967-293-01	SPRING, L COVER	
69	3-669-480-21 + PTPWH 2		
70	3-736-364-01	SPRING	

5-1-3. CABINET (R) SECTION



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
101	A-7072-359-B	CF-40 BOARD, COMPLETE (TR330E)		112	4-602-490-00	SPRING, TENSION	
101	A-7092-617-A	CF-40 BOARD, COMPLETE (TR510E)		113	A-7092-583-A	CABINET (R) ASSY (TR330E)	
102	3-719-601-01	SCREW (B2X5), TAPPING		113	A-7062-614-A	CABINET (R) ASSY (TR510E)	
103	1-775-520-11	CABLE, FLEXIBLE FLAT 45P		114	3-965-866-01	DIAL, AE	
104	3-965-867-01	RETAINER, AE DIAL		115	3-965-865-01	DISK, POWER	
105	3-965-894-01	BUTTON, CF		116	3-965-876-01	LEVER, LC	
106	3-965-895-01	HOLDER, CF BUTTON		117	3-965-877-01	HOLDER, PW	
107	3-965-879-01	SLIDER, BT		119	A-7072-356-A	PW-108 BOARD, COMPLETE	
108	3-965-878-01	HOLDER, BT		120	1-775-519-11	CABLE, FLEXIBLE FLAT 4P	
109	3-965-846-01	SPRING, COMPRESSION		121	3-965-842-01	HINGE, LITHIUM LID	
110	X-3945-447-1	DIAL ASSY, POWER		122	3-965-868-02	LID, LITHIUM	
111	3-965-884-01	BUTTON (3), REC MODE		123	3-966-706-01	BUTTON (3), MODE (TR510E)	
				124	3-965-829-31	PLATE, ORNAMENTAL, SWITCH (TR510E)	

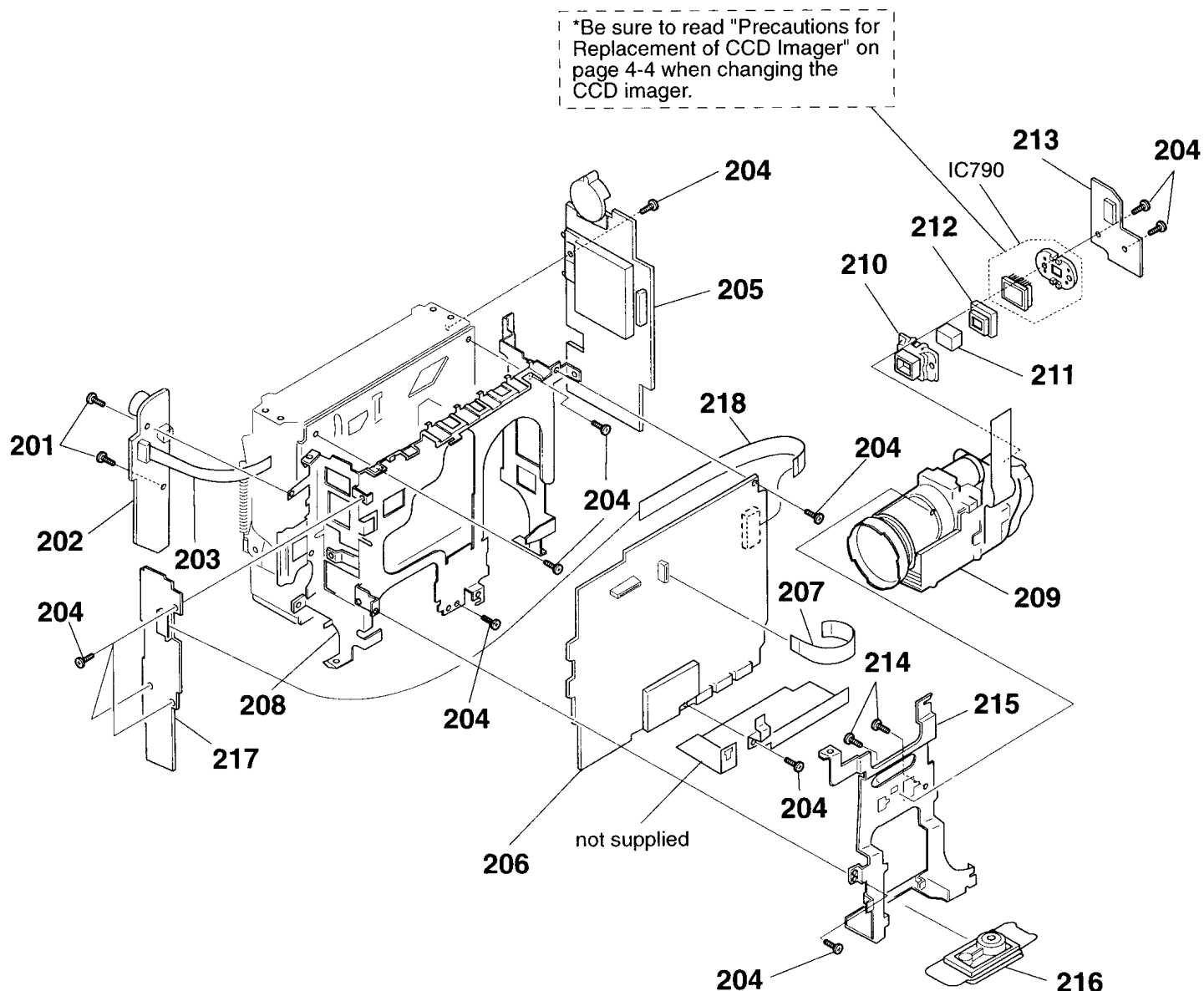
## 5-1-4. EVF SECTION



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
151	3-719-601-01	SCREW (B2X5), TAPPING		156	3-965-899-01	CABINET (R), EVF	
152	X-3945-456-1	CABINET (L) ASSY, EVF		157	X-3945-445-1	COVER ASSY, CRT	
153	3-948-339-01	SCREW, TAPPING		158	1-657-866-11	FP-283 FLEXIBLE BOARD	
154	X-3945-448-1	FINDER ASSY		⚠159	1-452-673-11	CRT ASSY (M01KXX90WB)	
155	3-963-160-01	EYE CUP (DM)		160	A-7072-357-A	VF-87P BOARD, COMPLETE	
				161	3-967-314-01	STICKER (SS), BODY (TR510E)	
				162	3-966-178-01	SCREW (1.7)	

**Note:** The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

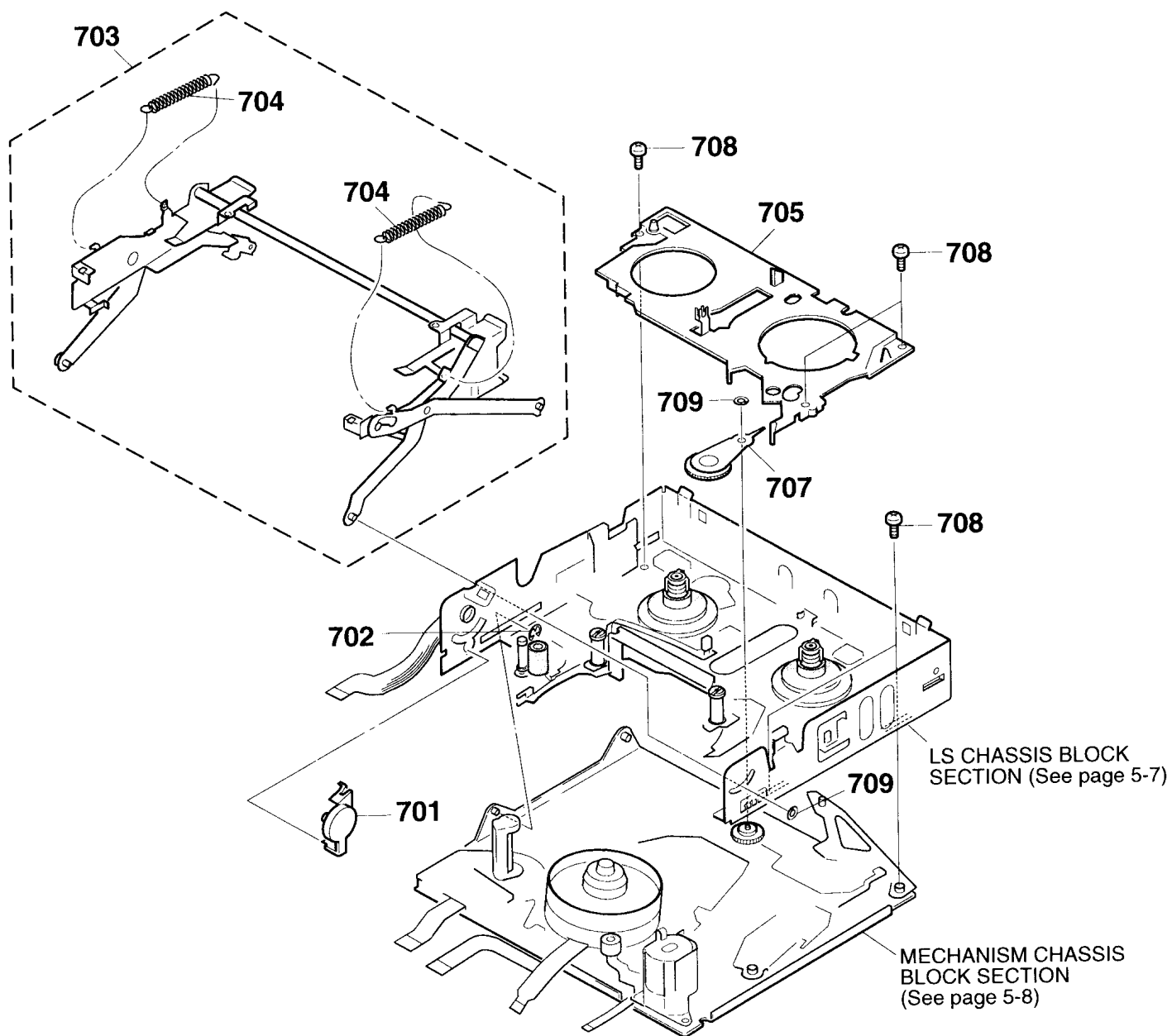
## 5-1-5. MAIN SECTION



Ref. No.	Part No.	Description	Remarks
201	3-962-826-01	SCREW (2X4)	
202	A-7072-353-A	JK-129 BOARD, COMPLETE	
203	1-775-518-11	CABLE, FLEXIBLE FLAT 12P	
204	3-713-786-21	SCREW (M2X3)	
205	A-7092-573-A	DD-80P BOARD, COMPLETE	
206	A-7092-572-A	VC-167P BOARD, COMPLETE (TR330E)	
206	A-7092-616-A	VC-167P BOARD, COMPLETE (TR510E)	
207	1-775-516-11	CABLE, FLEXIBLE FLAT 16P	
* 208	3-965-897-01	FRAME, MD	
209	1-547-833-11	LENS, ZOOM (VCL-6310WA) (TR330E)	
209	1-547-739-21	LENS, ZOOM (VCL-5412WB) (TR510E)	
210	3-957-990-11	ADAPTOR (C), CCD FITTING (TR330E)	
210	3-946-856-01	ADAPTOR (H), CCD FITTING (TR510E)	

Ref. No.	Part No.	Description	Remarks
211	1-547-558-21	FILTER BLOCK, OPTICAL (TR330E)	
211	1-547-735-51	FILTER BLOCK, OPTICAL (TR510E)	
212	3-957-980-11	RUBBER (C), SEAL (TR330E)	
212	3-960-149-01	RUBBER (3), SEAL (TR510E)	
213	A-7072-354-A	CD-139 BOARD, COMPLETE (TR330E)	
213	A-7072-420-A	CD-139 BOARD, COMPLETE (TR510E)	
214	3-947-268-11	2X7.5, +B TAPPING P TAIT (TR330E)	
214	3-947-268-01	2, +B TAPPING P TAIT (TR510E)	
* 215	3-965-898-01	FRAME, LENS	
216	3-965-871-01	SCREW (for TRIPOD)	
217	A-7072-422-A	TZ-3 BOARD, COMPLETE (TR510E)	
218	1-775-833-11	CABLE, FLEXIBLE FLAT 18P (TR510E)	
IC790	A-7030-369-A	CCD BLOCK ASSY (ICX055AK-11) (CCD IMAGER) (TR330E)	
IC790	A-7030-495-A	CCD BLOCK ASSY (ICX060AK-41) (CCD IMAGER) (TR510E)	

## 5-1-6. CASSETTE COMPARTMENT BLOCK SECTION



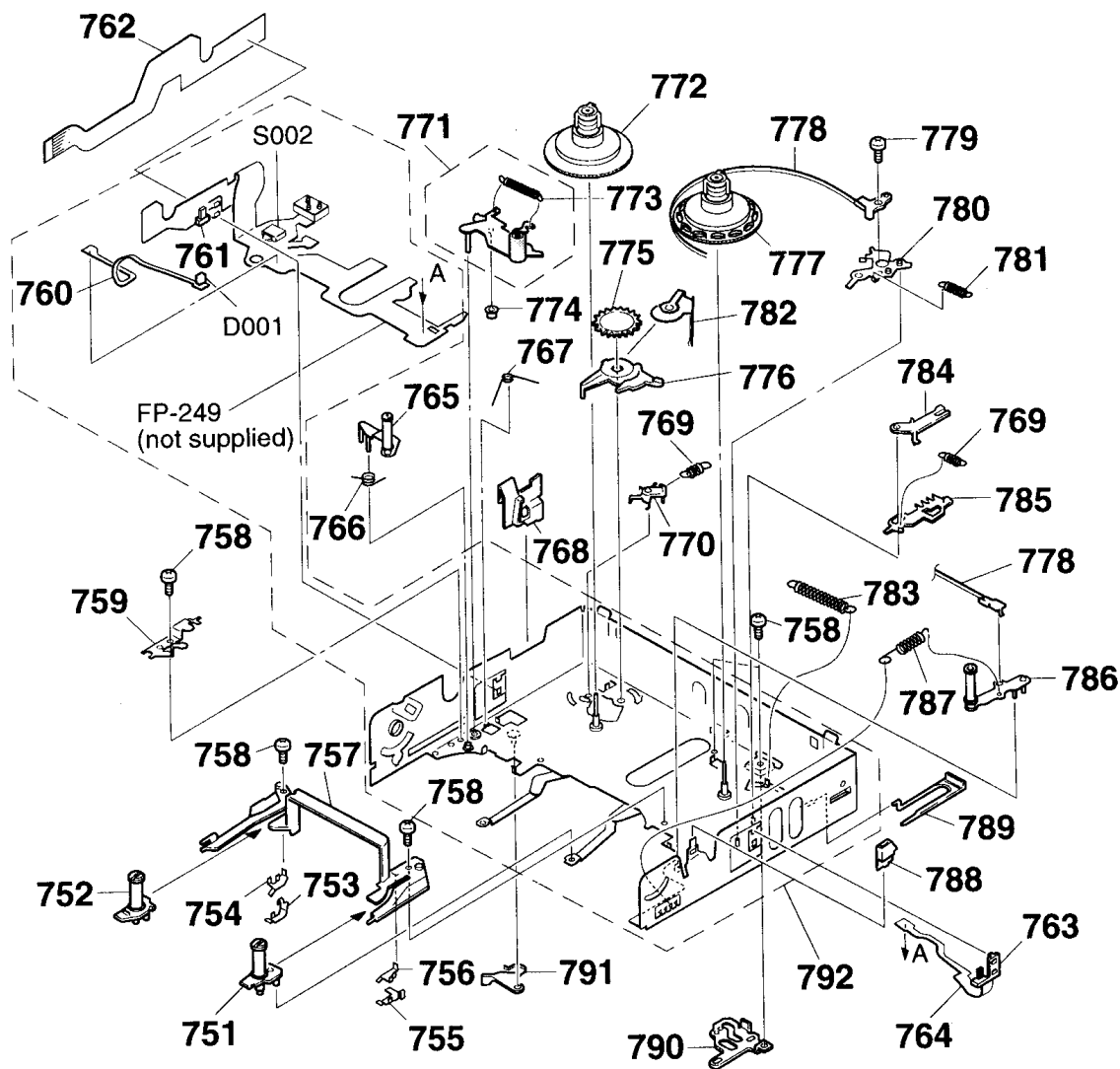
Ref. No.	Part No.	Description
701	A-7040-421-A	DAMPER ASSY
702	7-624-102-04	STOP RING 1.5, TYPE -E
703	X-3945-400-1	CASSETTE COMPARTMENT ASSY
704	3-965-587-01	SPRING, TENSION

Remarks

Ref. No.	Part No.	Description
705	3-965-584-01	RETAINER, GOOSENECK
707	X-3945-399-1	GEAR ASSY, GOOSENECK
708	3-947-503-01	SCREW (M1.4X2.5)
709	3-331-007-21	WASHER

Remarks

5-1-7. LS CHASSIS BLOCK SECTION

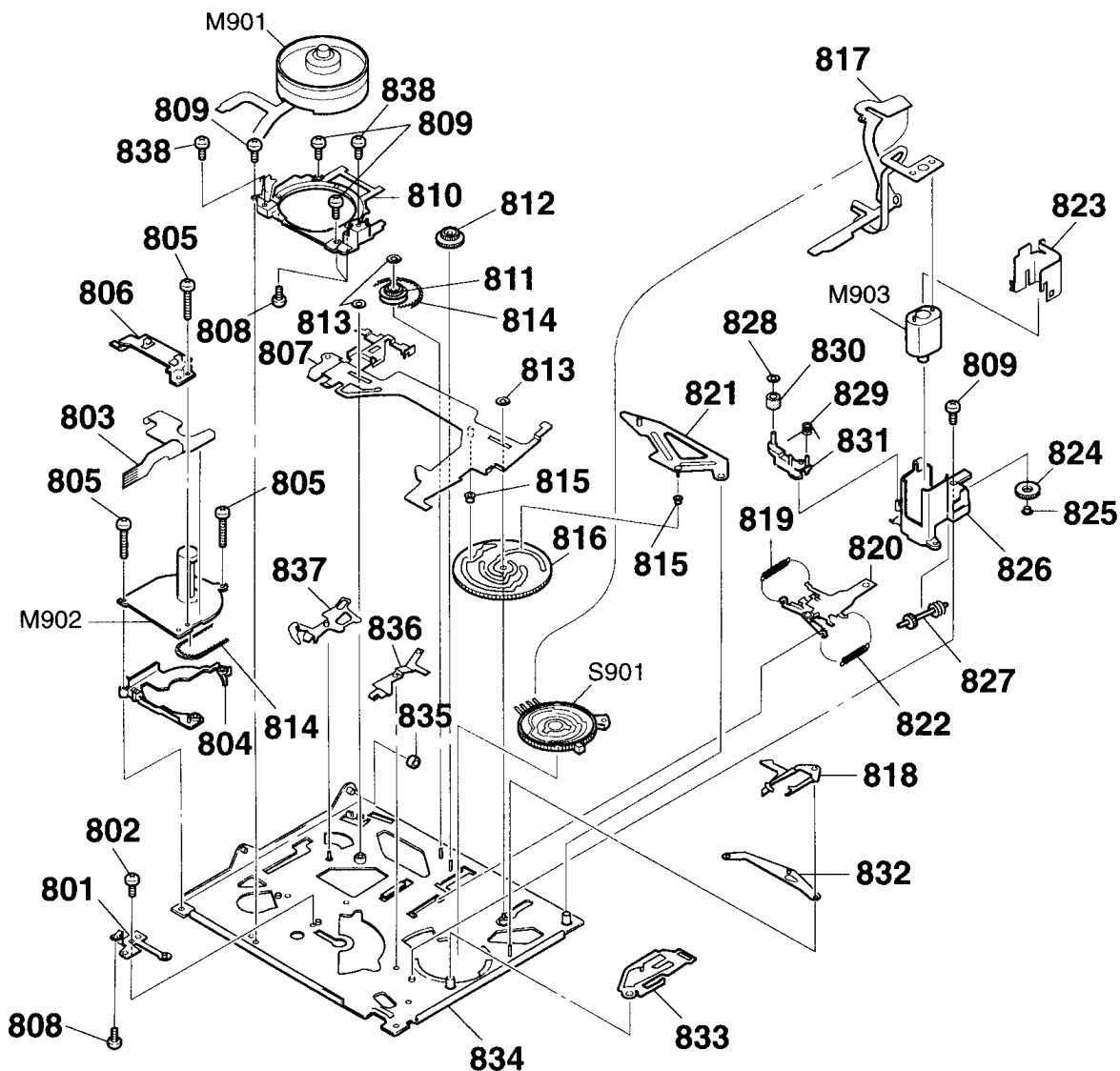


Ref. No.	Part No.	Description	Remarks
751	A-7040-419-A	BASE (S) BLOCK ASSY, GUIDE	
752	A-7040-418-A	BASE (T) BLOCK ASSY, GUIDE	
753	3-965-559-01	STOPPER (T)	
754	3-965-557-01	STOPPER (T), GB	
755	3-965-558-01	STOPPER (S)	
756	3-965-556-01	STOPPER (S), GB	
757	3-965-553-01	RAIL, GUIDE	
758	3-947-503-01	SCREW (M1.4X2.5)	
759	3-965-573-01	RETAINER, TG4	
760	1-658-213-11	FP-355 FLEXIBLE BOARD	
761	3-965-552-01	HOLDER (T), SENSOR	
762	1-657-786-11	FP-221 FLEXIBLE BOARD	
763	3-965-551-01	HOLDER (S), SENSOR	
764	1-658-214-11	FP-356 FLEXIBLE BOARD	
765	A-7040-417-A	ARM BLOCK ASSY, TG4	
766	3-965-574-01	SPRING, TORSION	
767	3-965-575-01	SPRING (PINCH), TORSION	
768	3-965-568-01	GUIDE, LOCK	
769	3-965-562-01	SPRING (RATCHET), TENSION	
770	3-965-581-01	RATCHET, T	
771	X-3945-394-1	ARM ASSY, PINCH	
772	X-3945-398-1	DECK ASSY, REEL, T	

Ref. No.	Part No.	Description	Remarks
773	3-965-648-01	SPRING (PINCH), TENSION	
774	3-965-579-01	ROLLER, PINCH PRESS	
775	3-965-563-01	GEAR, T SOFT	
776	3-965-565-01	CLAW, T SOFT	
777	X-3945-397-1	DECK ASSY, REEL, S	
778	X-3945-396-1	BAND ASSY, TENSION REGULATOR	
779	3-945-756-01	SCREW (M1.4X3)	
780	3-965-583-01	ARM, RVS	
781	3-965-580-01	SPRING, TENSION	
782	3-966-384-01	SPRING, T SOFT	
783	3-965-578-01	SPRING, TENSION	
784	3-965-560-01	RATCHET, S	
785	3-965-561-01	PLATE, RELEASE, S RATCHET	
786	X-3945-395-1	ARM ASSY, TG1	
787	3-965-576-01	SPRING (TG1), TENSION	
788	3-965-567-01	LID OPEN	
789	3-965-566-01	COVER, LS GUIDE	
* 790	3-965-577-01	PLATE, CAM, LS	
791	3-965-569-01	ARM, EJ	
792	A-7040-427-A	CHASSIS (S1) ASSY, LS	
D001	8-719-988-42	DIODE GL453	
S002	1-572-688-11	SWITCH, PUSH (1 KEY) (C.C.LOCK)	



## 5-1-8. MECHANISM CHASSIS BLOCK SECTION



Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
801	3-965-525-01	GROUND, SHAFT		822	3-965-535-01	SPRING, TENSION (SILVER)	
802	3-965-550-01	SCREW (M1.7X1.4)		823	3-965-542-01	SHIELD, MOTOR	
803	1-657-785-11	FP-248 FLEXIBLE BOARD		824	3-965-539-01	GEAR (A)	
804	3-965-545-01	SPACER, CAPSTAN		825	3-965-538-01	SLEEVE, MOTOR HOLDER	
805	3-965-549-01	SCREW (M1.4X6.5)		826	3-965-540-01	HOLDER, MOTOR	
806	3-966-349-01	HOLDER, FLEXIBLE		827	3-965-541-01	SHAFT, WORM	
807	X-3945-387-1	SLIDER ASSY, M		828	3-321-393-01	WASHER, STOPPER	
808	3-965-588-01	SCREW (M1.4)		829	3-965-724-01	SPRING, TORSION	
809	3-947-503-01	SCREW (M1.4X2.5)		830	A-7040-423-A	ROLLER BLOCK ASSY, HC	
810	A-7040-416-A	BASE BLOCK ASSY, DRUM		831	X-3945-407-1	ARM ASSY, HC ROLLER	
811	3-965-527-01	GEAR, CHANGE		832	3-965-531-01	ARM, GL	
812	3-965-544-01	GEAR, RELAY		833	3-965-530-01	PLATE (2), REGULATOR, TENSION	
813	3-331-007-21	WASHER		834	X-3945-386-1	CHASSIS ASSY, MECHANICAL	
814	3-965-546-01	BELT, TIMING		835	3-965-526-01	ROLLER, LS GUIDE	
815	3-965-533-01	ROLLER, LS		836	3-965-547-01	ARM, HC DRIVING	
816	3-965-528-01	GEAR, CAM		837	3-965-534-01	PLATE, PRESS, PINCH	
817	1-657-784-11	FP-220 FLEXIBLE BOARD		838	3-966-819-01	SCREW +P 1.4X3	
818	3-965-529-01	PLATE, REGULATOR, TENSION		M901	A-7048-806-A	DRUM BLOCK ASSY (DGH-OC2A-R)	
819	3-965-536-01	SPRING, TENSION (BLACK)		M902	8-835-531-01	MOTOR, DC SCE-0601A (CAPSTAN)	
820	X-3945-388-1	SLIDER ASSY, GL		M903	X-3945-401-1	MOTOR ASSY, DC (LOADING)	
821	3-965-532-01	ARM, LS		S901	1-762-436-11	SWITCH, ROTARY (ENCODER)	

## 5-2. ELECTRICAL PARTS LIST

## NOTE:

When indicating parts by reference number, please include the board name.

The components identified by mark  $\Delta$  or dotted line with mark  $\Delta$  are critical for safety.  
Replace only with part number specified.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- CAPACITORS:  
uF:  $\mu$ F
- RESISTORS  
All resistors are in ohms.  
METAL: metal-film resistor  
METAL OXIDE: Metal Oxide-film resistor  
F: nonflammable
- COILS  
uH:  $\mu$ H
- SEMICONDUCTORS  
In each case, u:  $\mu$ , for example:  
uA...:  $\mu$ A..., uPA...,  $\mu$ PA...,  
uPB...,  $\mu$ PB..., uPC...,  $\mu$ PC...,  
uPD...,  $\mu$ PD...

Ref. No.	Part No.	Description	Remarks
	A-7072-354-A	CD-139 BOARD, COMPLETE (TR330E) *****	
	A-7072-420-A	CD-139 BOARD, COMPLETE (TR510E) *****	
(Ref.No. 2,000 Series)			

## &lt; CAPACITOR &gt;

C790	1-126-603-11	ELECT CHIP	4.7uF	20%	35V
C791	1-164-346-11	CERAMIC CHIP	1uF		16V
C792	1-126-607-11	ELECT CHIP	47uF	20%	4V
C793	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C794	1-126-603-11	ELECT CHIP	4.7uF	20%	35V
C795	1-162-919-11	CERAMIC CHIP	22PF	5%	50V(TR330E)

## &lt; CONNECTOR &gt;

CN790	1-691-354-21	CONNECTOR, FFC/FPC (ZIF) 16P	
-------	--------------	------------------------------	--

## &lt; IC &gt;

IC790	A-7030-369-A	CCD BLOCK ASSY(ICX055AK-11) (CCD IMAGER) (TR330E)	
IC790	A-7030-495-A	CCD BLOCK ASSY(ICX060AK-41) (CCD IMAGER) (TR510E)	

## &lt; COIL &gt;

L790	1-412-963-11	INDUCTOR 100uH	
------	--------------	----------------	--

## &lt; TRANSISTOR &gt;

Q790	8-729-117-73	TRANSISTOR	2SC4178-F14
Q791	8-729-232-86	TRANSISTOR	2SK1875

## &lt; RESISTOR &gt;

R791	1-216-839-11	METAL CHIP	33K	5%	1/16W(TR330E)
R791	1-216-840-11	METAL CHIP	39K	5%	1/16W(TR510E)
R792	1-216-819-11	METAL CHIP	680	5%	1/16W(TR330E)
R792	1-216-820-11	METAL CHIP	820	5%	1/16W(TR510E)
R793	1-216-849-11	METAL CHIP	220K	5%	1/16W(TR330E)

Ref. No.	Part No.	Description	Remarks
R793	1-218-895-11	METAL CHIP	100K 0.50% 1/16W(TR510E)
R794	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
R795	1-216-809-11	METAL CHIP	100 5% 1/16W
R796	1-216-833-11	METAL CHIP	10K 5% 1/16W

A-7072-359-B CF-40 BOARD, COMPLETE (TR330E)  
\*\*\*\*\*

A-7092-617-A CF-40 BOARD, COMPLETE (TR510E)  
\*\*\*\*\*

(Ref.No. 2,000 Series)

3-831-441-XX CUSHION (5)

## &lt; BUZZER &gt;

BU480	1-529-107-11	BUZZER, PIEZOELECTRIC	
-------	--------------	-----------------------	--

## &lt; CAPACITOR &gt;

C300	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C301	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C302	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C303	1-104-847-11	TANTAL. CHIP	22uF	20%	4V
C304	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C305	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C306	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C308	1-104-847-11	TANTAL. CHIP	22uF	20%	4V
C310	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C311	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C312	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C313	1-164-360-11	CERAMIC CHIP	0.1uF		16V(TR510E)
C314	1-135-091-91	TANTAL. CHIP	1uF	20%	16V(TR510E)
C315	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C316	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C317	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C318	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C319	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C320	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V
C321	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V

Ref. No.	Part No.	Description	Remarks
C323	1-135-259-11	TANTAL. CHIP 10uF	20% 6.3V
C325	1-104-850-11	TANTAL. CHIP 6.8uF	20% 10V
C326	1-165-176-11	CERAMIC CHIP 0.047uF	10% 16V
C327	1-165-176-11	CERAMIC CHIP 0.047uF	10% 16V
C328	1-162-970-11	CERAMIC CHIP 0.01uF	10% 25V
C336	1-162-970-11	CERAMIC CHIP 0.01uF 10% 25V	(TR510E)
< CONNECTOR >			
CN480	1-774-054-21	CONNECTOR, FFC/FPC (ZIF) 45P	
CN481	1-691-346-11	CONNECTOR, FFC/FPC (ZIF) 8P	
CN482	1-764-703-11	CONNECTOR, FFC/FPC (LIF) 4P	
< DIODE >			
D300	8-719-404-49	DIODE MA111	
D301	8-719-027-50	DIODE MA142WK	
D303	8-719-420-14	DIODE MA8082-M	
D304	8-719-420-14	DIODE MA8082-M	
D310	8-719-039-99	DIODE UMZ8.2TT106	(TR330E, TR510E: AEP/UK)
D312	8-719-420-14	DIODE MA8082-M	
D314	8-719-404-49	DIODE MA111 (TR510E)	
D315	8-719-404-49	DIODE MA111 (TR510E)	
△D316	8-719-421-27	DIODE MA728	
D317	8-719-404-49	DIODE MA111	
D318	8-719-404-49	DIODE MA111	
D321	8-719-420-14	DIODE MA8082-M	
D323	8-719-404-49	DIODE MA111	
D324	8-719-420-14	DIODE MA8082-M	
D325	8-719-420-14	DIODE MA8082-M	
D326	8-719-420-14	DIODE MA8082-M	
D327	8-719-420-14	DIODE MA8082-M	
D328	8-719-420-14	DIODE MA8082-M	
D480	8-719-951-20	DIODE BR1102W	
< FILTER >			
FL300	1-411-527-21	COIL, OSC	
< HOLDER >			
△HL480	1-550-104-11	HOLDER, BATTERY	
< IC >			
IC301	8-759-298-10	IC S-8423NFS-T2	
IC302	8-759-059-05	IC TL1596CPW	
IC303	8-759-364-02	IC MB89082PFV-G-105-BND	
< JACK >			
J480	1-565-276-21	JACK, ULTRA SMALL 1P (LANC)	
< COIL >			
L300	1-414-078-11	INDUCTOR 10uH	

Ref. No.	Part No.	Description	Remarks
< IC LINK >			
△PS301	1-576-122-21	LINK, IC	
< TRANSISTOR >			
Q301	8-729-823-16	TRANSISTOR 2SC4555-5.6.7	(TR510E)
Q302	8-729-032-00	TRANSISTOR 2SJ381-TD	(TR510E)
Q303	8-729-402-81	TRANSISTOR XN4501	(TR510E)
Q304	8-729-015-76	TRANSISTOR UN5211	(TR510E)
Q305	8-729-015-76	TRANSISTOR UN5211	
< RESISTOR >			
R300	1-216-853-11	METAL CHIP 470K 5%	1/16W
R301	1-216-853-11	METAL CHIP 470K 5%	1/16W
R303	1-216-853-11	METAL CHIP 470K 5%	1/16W
R304	1-216-817-11	METAL CHIP 470 5%	1/16W
R305	1-216-864-11	METAL CHIP 0 5%	1/16W
R306	1-216-801-11	METAL CHIP 22 5%	1/16W
R307	1-216-853-11	METAL CHIP 470K 5%	1/16W
R308	1-216-853-11	METAL CHIP 470K 5%	1/16W
R309	1-216-853-11	METAL CHIP 470K 5%	1/16W
R310	1-216-827-11	METAL CHIP 3.3K 5%	1/16W
R311	1-216-841-11	METAL CHIP 47K 5%	1/16W
R312	1-216-821-11	METAL CHIP 1K 5%	1/16W
R313	1-216-821-11	METAL CHIP 1K 5%	1/16W
R314	1-216-821-11	METAL CHIP 1K 5%	1/16W
R315	1-216-821-11	METAL CHIP 1K 5%	1/16W
R316	1-216-821-11	METAL CHIP 1K 5%	1/16W
R317	1-216-821-11	METAL CHIP 1K 5%	1/16W
R318	1-216-821-11	METAL CHIP 1K 5%	1/16W
R319	1-216-821-11	METAL CHIP 1K 5%	1/16W
R320	1-216-821-11	METAL CHIP 1K 5%	1/16W
R321	1-216-821-11	METAL CHIP 1K 5%	1/16W
R322	1-216-821-11	METAL CHIP 1K 5%	1/16W
R323	1-216-833-11	METAL CHIP 10K 5%	1/16W
R324	1-216-864-11	METAL CHIP 0 5%	1/16W
R325	1-216-864-11	METAL CHIP 0 5%	1/16W
R326	1-216-853-11	METAL CHIP 470K 5%	1/16W
R327	1-216-864-11	METAL CHIP 0 5%	1/16W
R331	1-216-864-11	METAL CHIP 0 5%	1/16W
R332	1-216-864-11	METAL CHIP 0 5%	1/16W (TR330E)
R333	1-216-853-11	METAL CHIP 470K 5%	1/16W
R334	1-216-845-11	METAL CHIP 100K 5%	1/16W
R335	1-216-817-11	METAL CHIP 470 5%	1/16W
R336	1-216-833-11	METAL CHIP 10K 5%	1/16W (TR510E)
R337	1-216-825-11	METAL CHIP 2.2K 5%	1/16W (TR510E)
R338	1-216-857-11	METAL CHIP 1M 5%	1/16W (TR510E)
R339	1-216-833-11	METAL CHIP 10K 5%	1/16W (TR510E)
R340	1-216-833-11	METAL CHIP 10K 5%	1/16W (TR510E)
R341	1-216-853-11	METAL CHIP 470K 5%	1/16W
R342	1-216-853-11	METAL CHIP 470K 5%	1/16W
R343	1-216-853-11	METAL CHIP 470K 5%	1/16W

**Note:** The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remarks			
R345	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R346	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R350	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R351	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R352	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R353	1-216-864-11	METAL CHIP	0	5%	1/16W	
R354	1-216-864-11	METAL CHIP	0	5%	1/16W	
R355	1-216-864-11	METAL CHIP	0	5%	1/16W	
R356	1-216-864-11	METAL CHIP	0	5%	1/16W	
R357	1-216-831-11	METAL CHIP	6.8K	5%	1/16W	
R358	1-216-864-11	METAL CHIP	0	5%	1/16W	
R359	1-216-805-11	METAL CHIP	47	5%	1/16W	
R362	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R363	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R364	1-216-864-11	METAL CHIP	0	5%	1/16W	
R365	1-216-864-11	METAL CHIP	0	5%	1/16W (TR510E)	
R370	1-216-864-11	METAL CHIP	0	5%	1/16W	
R371	1-216-864-11	METAL CHIP	0	5%	1/16W	
R372	1-216-864-11	METAL CHIP	0	5%	1/16W	
R373	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R374	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R375	1-216-853-11	METAL CHIP	470K	5%	1/16W	
R376	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R377	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R378	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R379	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R380	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R381	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R384	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R386	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R387	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R389	1-216-849-11	METAL CHIP	220K	5%	1/16W	
R390	1-216-849-11	METAL CHIP	220K	5%	1/16W	
R391	1-216-821-11	METAL CHIP	1K	5%	1/16W (TR510E)	
R392	1-216-826-11	METAL CHIP	2.7K	5%	1/16W	
R393	1-216-809-11	METAL CHIP	100	5%	1/16W	
R394	1-218-290-11	METAL GLAZE	6.2K	5%	1/16W	
R395	1-216-833-11	METAL CHIP	10K	5%	1/16W (TR510E)	
R396	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R397	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R398	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R399	1-216-851-11	METAL CHIP	330K	5%	1/16W	
R490	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R494	1-216-864-11	METAL CHIP	0	5%	1/16W	
R495	1-216-864-11	METAL CHIP	0	5%	1/16W	
R496	1-216-797-11	METAL CHIP	10	5%	1/16W	
R497	1-216-864-11	METAL CHIP	0	5%	1/16W	
R499	1-216-836-11	METAL CHIP	18K	5%	1/16W	

Ref. No.	Part No.	Description	Remarks			
		< SWITCH >				
S300	1-553-977-71	SWITCH, SLIDE	(D ZOOM)	(TR510E)		
S301	1-762-333-21	SWITCH, TACTILE	(TITLE)			
S480	1-762-333-21	SWITCH, TACTILE	(DATE(+))			
S481	1-762-333-21	SWITCH, TACTILE	(TIME(NEXT))			
S482	1-762-333-21	SWITCH, TACTILE	(COUNTER RESET)			
S483	1-553-977-71	SWITCH, SLIDE	(REC MODE)			
S484	1-762-333-21	SWITCH, TACTILE	(BACK LIGHT)			
S485	1-570-113-11	SWITCH, SLIDE	(START/STOP MODE)			
S486	1-570-113-11	SWITCH, SLIDE	(STEADY SHOT/WIDE TV)	(TR510E)		
S487	1-553-977-71	SWITCH, SLIDE	(COMMANDER)			
S488	1-553-977-71	SWITCH, SLIDE	(BEEP)			
S489	1-762-442-21	SWITCH, ROTARY	(PROGRAM AE)			

## &lt; VIBRATOR &gt;

X302	1-579-463-11	VIBRATOR, CRYSTAL	32KHz			
XTL301	1-579-369-21	VIBRATOR	10MHz			

A-7092-573-A DD-80P BOARD, COMPLETE

\*\*\*\*\*

(Ref.No.1,000 Series)

## &lt; CAPACITOR &gt;

C001	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C002	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C003	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C004	1-162-957-11	CERAMIC CHIP	220PF	5%	50V	
C005	1-162-967-11	CERAMIC CHIP	0.0033uF	10%	50V	
C006	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
C007	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V	
C008	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
C009	1-164-245-11	CERAMIC CHIP	0.015uF	10%	25V	
C010	1-128-004-11	ELECT CHIP	10uF	20%	16V	
C011	1-128-004-11	ELECT CHIP	10uF	20%	16V	
C012	1-128-004-11	ELECT CHIP	10uF	20%	16V	
C013	1-128-065-11	ELECT	68uF	20%	10V	
C014	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V	
C016	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
C018	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
C019	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
C022	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
C024	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
C025	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V	
C026	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V	
C027	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V	
C028	1-165-178-11	CERAMIC CHIP	6.8uF		16V	
C029	1-165-178-11	CERAMIC CHIP	6.8uF		16V	
C030	1-165-178-11	CERAMIC CHIP	6.8uF		16V	

Ref. No.	Part No.	Description	Remarks
C031	1-113-606-11	SOLID CHIP	4.7uF 20% 10V (TR330E)
C031	1-115-170-91	TANTALUM	4.7uF 20% 10V (TR510E)
C032	1-113-606-11	SOLID CHIP	4.7uF 20% 10V (TR330E)
C032	1-115-170-91	TANTALUM	4.7uF 20% 10V (TR510E)
C033	1-113-606-11	SOLID CHIP	4.7uF 20% 10V (TR330E)
C033	1-115-169-91	TANTALUM	10uF 20% 6.3V (TR510E)
C034	1-113-606-11	SOLID CHIP	4.7uF 20% 10V (TR330E)
C034	1-115-170-91	TANTALUM	4.7uF 20% 10V (TR510E)
C035	1-164-505-11	CERAMIC CHIP	2.2uF 16V
C036	1-113-606-11	SOLID CHIP	4.7uF 20% 10V (TR330E)
C036	1-115-169-91	TANTALUM	10uF 20% 6.3V (TR510E)
C037	1-164-505-11	CERAMIC CHIP	2.2uF 16V
C038	1-128-004-11	ELECT CHIP	10uF 20% 16V
C039	1-128-004-11	ELECT CHIP	10uF 20% 16V
C040	1-128-004-11	ELECT CHIP	10uF 20% 16V
C041	1-128-004-11	ELECT CHIP	10uF 20% 16V
C042	1-128-004-11	ELECT CHIP	10uF 20% 16V
C043	1-107-682-11	CERAMIC CHIP	1uF 10% 16V
C044	1-128-004-11	ELECT CHIP	10uF 20% 16V
C045	1-128-006-11	ELECT CHIP	4.7uF 20% 25V
C046	1-128-006-11	ELECT CHIP	4.7uF 20% 25V
C047	1-162-964-11	CERAMIC CHIP	0.001uF 10% 50V
C048	1-162-964-11	CERAMIC CHIP	0.001uF 10% 50V

## < CONNECTOR >

\* CN003 1-691-935-11 CONNECTOR, BOARD TO BOARD 38P

## < DIODE >

D001 8-719-989-33 DIODE FC806  
D002 8-719-420-14 DIODE MA8082-M

## < IC >

IC001 8-759-350-29 IC SN104213PM-T6

## < JACK >

J001 1-537-241-11 TERMINAL BOARD (BATTERY)

## < COIL >

L002 1-411-460-21 COEL, CHOKE 10uH  
L003 1-411-460-21 COEL, CHOKE 10uH  
L004 1-411-460-21 COEL, CHOKE 10uH  
L005 1-409-533-11 COIL, CHOKE 47uH  
L006 1-409-533-11 COIL, CHOKE 47uH  
L007 1-409-531-11 COIL, CHOKE 22uH  
L008 1-409-533-11 COIL, CHOKE 47uH  
L009 1-409-531-11 COIL, CHOKE 22uH  
L010 1-412-056-11 INDUCTOR CHIP 4.7uH  
L011 1-412-056-11 INDUCTOR CHIP 4.7uH

Ref. No.	Part No.	Description	Remarks
L012	1-412-056-11	INDUCTOR CHIP	4.7uH
L013	1-412-056-11	INDUCTOR CHIP	4.7uH
L014	1-412-066-21	INDUCTOR CHIP	220uH
L015	1-412-066-21	INDUCTOR CHIP	220uH
L016	1-412-056-11	INDUCTOR CHIP	4.7uH
L017	1-412-056-11	INDUCTOR CHIP	4.7uH
L018	1-412-056-11	INDUCTOR CHIP	4.7uH

## < IC LINK >

△PS002 1-533-284-11 LINK, CHIP IC  
△PS003 1-533-284-11 LINK, CHIP IC  
△PS004 1-533-284-11 LINK, CHIP IC

## < TRANSISTOR >

Q001 8-729-033-14 TRANSISTOR FP107-TL  
Q002 8-729-033-14 TRANSISTOR FP107-TL  
Q003 8-729-804-41 TRANSISTOR 2SB1122-ST-TD  
Q004 8-729-033-14 TRANSISTOR FP107-TL  
Q005 8-729-033-14 TRANSISTOR FP107-TL  
Q006 8-729-033-14 TRANSISTOR FP107-TL  
Q007 8-729-030-75 TRANSISTOR 2SK2316-TD  
Q008 8-729-402-42 TRANSISTOR UN5213-TX

## < RESISTOR >

R001 1-216-841-11 METAL CHIP 47K 5% 1/16W  
R002 1-216-835-11 METAL CHIP 15K 5% 1/16W  
R003 1-216-837-11 METAL CHIP 22K 5% 1/16W  
R004 1-216-829-11 METAL CHIP 4.7K 5% 1/16W  
R005 1-216-839-11 METAL CHIP 33K 5% 1/16W  
R006 1-216-837-11 METAL CHIP 22K 5% 1/16W  
R007 1-216-821-11 METAL CHIP 1K 5% 1/16W  
R008 1-216-813-11 METAL CHIP 220 5% 1/16W  
R009 1-216-841-11 METAL CHIP 47K 5% 1/16W  
R010 1-216-845-11 METAL CHIP 100K 5% 1/16W  
R014 1-216-821-11 METAL CHIP 1K 5% 1/16W  
R015 1-216-819-11 METAL CHIP 680 5% 1/16W  
R016 1-216-864-11 METAL CHIP 0 5% 1/16W  
R017 1-216-833-11 METAL CHIP 10K 5% 1/16W  
R018 1-216-833-11 METAL CHIP 10K 5% 1/16W  
R019 1-216-833-11 METAL CHIP 10K 5% 1/16W  
R020 1-216-835-11 METAL CHIP 15K 5% 1/16W  
R021 1-216-839-11 METAL CHIP 33K 5% 1/16W  
R022 1-216-831-11 METAL CHIP 6.8K 5% 1/16W  
R023 1-216-797-11 METAL CHIP 10 5% 1/16W  
R024 1-216-837-11 METAL CHIP 22K 5% 1/16W  
R025 1-216-841-11 METAL CHIP 47K 5% 1/16W  
R026 1-216-864-11 METAL CHIP 0 5% 1/16W  
R027 1-216-833-11 METAL CHIP 10K 5% 1/16W  
R033 1-216-833-11 METAL CHIP 10K 5% 1/16W

**Note:** The components identified by mark △ or dotted line with mark △ are critical for safety.  
Replace only with part number specified.

**DD-80P****FP-249****JK-129****MA-238**

Ref. No.	Part No.	Description	Remarks
		< SWITCH >	
S001	1-572-688-11	SWITCH, PUSH (1 KEY) (START/STOP)	
S002	1-572-467-21	SWITCH, PUSH (1 KEY) (EJECT)	
S003	1-762-441-11	SWITCH, ROTARY (ZOOM SW)	
S004	1-572-688-11	SWITCH, PUSH (1 KEY) (STANDBY)	
		< TRANSFORMER >	
T001	1-429-164-21	TRANSFORMER, DC/DC CONVERTER	
		FP-249 BOARD	
		*****	
		(Ref.No.5,000 Series)	
		1-658-214-11 FP-356 FLEXIBLE BOARD	
		3-965-551-01 HOLDER (S), SENSOR	
		3-965-552-01 HOLDER (T), SENSOR	
		< HOLE ELEMENT >	
H001	8-719-033-37	ELEMENT, HALL HW-105C	
H002	8-719-033-37	ELEMENT, HALL HW-105C	
		< TRANSISTOR >	
Q001	8-729-907-25	PHOTO TRANSISTOR PT4850F	
Q002	8-729-907-25	PHOTO TRANSISTOR PT4850F	
		< SWITCH >	
S001	1-692-614-11	SWITCH, PUSH (3 KEY) (REC PROOF)	
S002	1-572-688-11	SWITCH, PUSH (1 KEY) (C.C. LOCK)	
		A-7072-353-A JK-129 BOARD, COMPLETE	
		*****	
		(Ref.No.2,000 Series)	
		< CONNECTOR >	
* CN060	1-764-521-11	CONNECTOR, FFC/FPC (ZIF) 12P	
		< DIODE >	
D060	8-719-027-50	DIODE MA142WK	
D061	8-719-404-49	DIODE MA111	
D063	8-719-039-99	DIODE UMZ8.2T-T106 (TR330E, TR510E:AEP/UK)	
D069	8-719-039-99	DIODE UMZ8.2T-T106 (TR330E, TR510E:AEP/UK)	
		< JACK >	
J060	1-537-726-11	TERMINAL BOARD (VIDEO/AUDIO OUT)	

Ref. No.	Part No.	Description	Remarks
	A-7072-358-A	MA-238 BOARD, COMPLETE	
		*****	
		(Ref.No.2,000 Series)	
		< CAPACITOR >	
C964	1-162-927-11	CERAMIC CHIP 100PF	5% 50V
C978	1-162-970-11	CERAMIC CHIP 0.01uF	10% 25V
C980	1-164-004-11	CERAMIC CHIP 0.1uF	10% 25V
C982	1-165-128-11	CERAMIC CHIP 0.22uF	16V
C983	1-162-927-11	CERAMIC CHIP 100PF	5% 50V
C984	1-162-970-11	CERAMIC CHIP 0.01uF	10% 25V
C985	1-164-004-11	CERAMIC CHIP 0.1uF	10% 25V
C986	1-164-004-11	CERAMIC CHIP 0.1uF	10% 25V
C988	1-164-346-11	CERAMIC CHIP 1uF	16V
C990	1-126-607-11	ELECT CHIP 47uF	20% 4V
C991	1-164-245-11	CERAMIC CHIP 0.015uF	10% 25V
C993	1-124-779-00	ELECT CHIP 10uF	20% 16V
		< CONNECTOR >	
CN951	1-764-707-21	CONNECTOR, FFC/FPC (LIF) 8P	
CN953	1-580-055-21	PIN, CONNECTOR 2P	
		< DIODE >	
D951	8-719-404-49	DIODE MA111	
D952	8-719-404-49	DIODE MA111	
		< IC >	
IC952	8-759-339-63	IC NJM2118V-TE2	
IC953	8-749-925-07	IC RS-30E-T	
		< JACK >	
J951	1-568-027-11	JACK, SMALL TYPE 1P (MIC)	
		< COIL >	
L952	1-412-939-11	INDUCTOR 1uH	
L953	1-412-939-11	INDUCTOR 1uH	
		< TRANSISTOR >	
Q951	8-729-420-24	TRANSISTOR 2SB1218A-QRS-TX	
		< RESISTOR >	
R972	1-216-864-11	METAL CHIP 0 5%	1/16W
R974	1-216-864-11	METAL CHIP 0 5%	1/16W
R978	1-216-823-11	METAL CHIP 1.5K 5%	1/16W
R979	1-216-819-11	METAL CHIP 680 5%	1/16W
R980	1-216-830-11	METAL CHIP 5.6K 5%	1/16W
R981	1-216-838-11	METAL CHIP 27K 5%	1/16W
R982	1-216-831-11	METAL CHIP 6.8K 5%	1/16W
R983	1-216-838-11	METAL CHIP 27K 5%	1/16W
R997	1-216-809-11	METAL CHIP 100 5%	1/16W

Ref. No.	Part No.	Description	Remarks
	A-7072-356-A	PW-108 BOARD, COMPLETE *****	(Ref.No.2,000 Series)

## &lt; CONNECTOR &gt;

CN583 1-764-703-11 CONNECTOR, FFC/FPC (LIF) 4P

## &lt; SWITCH &gt;

S490 1-572-467-21 SWITCH, PUSH (1 KEY) (CAMERA)  
S491 1-572-467-21 SWITCH, PUSH (1 KEY) (PLAYER)

A-7072-422-A TZ-3 BOARD, COMPLETE (TR510E)  
\*\*\*\*\*  
(Ref.No.5,000 Series)

## &lt; CAPACITOR &gt;

C650	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C651	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C652	1-104-908-11	TANTAL. CHIP	47uF	20%	4V
C653	1-104-908-11	TANTAL. CHIP	47uF	20%	4V
C654	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C655	1-164-156-11	CERAMIC CHIP	0.1uF	25V	
C656	1-164-299-11	CERAMIC CHIP	0.22uF	10%	25V
C657	1-164-299-11	CERAMIC CHIP	0.22uF	10%	25V
C658	1-164-245-11	CERAMIC CHIP	0.015uF	10%	25V
C659	1-164-245-11	CERAMIC CHIP	0.015uF	10%	25V
C660	1-128-257-21	ELECT CHIP	33uF	20%	10V
C661	1-128-257-21	ELECT CHIP	33uF	20%	10V
C663	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C664	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C665	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C666	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C667	1-164-156-11	CERAMIC CHIP	0.1uF	25V	
C668	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C669	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C670	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C671	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C672	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C673	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C674	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C675	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V

## &lt; CONNECTOR &gt;

CN650 1-691-356-21 CONNECTOR, FFC/FPC (ZIF) 18P

## &lt; IC &gt;

IC650 8-759-080-34 IC TA75W01FU-TE12R  
IC651 8-759-058-45 IC NJM3403AV(TE2)  
IC652 8-759-234-77 IC TC4S66F  
IC653 8-759-234-77 IC TC4S66F  
IC654 8-759-248-78 IC MB88102PFV-G-BND-ER  
  
IC655 8-752-867-95 IC CXP81120-016R

Ref. No.	Part No.	Description	Remarks
		< COIL >	

L650 1-414-078-11 INDUCTOR 10uH  
L651 1-414-078-11 INDUCTOR 10uH  
L652 1-412-058-11 INDUCTOR CHIP 10uH

## &lt; TRANSISTOR &gt;

Q650 8-729-402-42 TRANSISTOR UN5213

## &lt; RESISTOR &gt;

R650	1-216-837-11	METAL CHIP	22K	5%	1/16W
R651	1-216-837-11	METAL CHIP	22K	5%	1/16W
R652	1-216-837-11	METAL CHIP	22K	5%	1/16W
R653	1-216-837-11	METAL CHIP	22K	5%	1/16W
R654	1-216-837-11	METAL CHIP	22K	5%	1/16W
R655	1-216-837-11	METAL CHIP	22K	5%	1/16W
R656	1-216-803-11	METAL CHIP	33	5%	1/16W
R658	1-216-833-11	METAL CHIP	10K	5%	1/16W
R659	1-216-833-11	METAL CHIP	10K	5%	1/16W
R660	1-218-911-11	METAL CHIP	470K	0.50%	1/16W
R661	1-218-911-11	METAL CHIP	470K	0.50%	1/16W
R662	1-218-911-11	METAL CHIP	470K	0.50%	1/16W
R663	1-218-911-11	METAL CHIP	470K	0.50%	1/16W
R664	1-216-833-11	METAL CHIP	10K	5%	1/16W
R665	1-216-850-11	METAL CHIP	270K	5%	1/16W
R666	1-216-850-11	METAL CHIP	270K	5%	1/16W
R667	1-216-833-11	METAL CHIP	10K	5%	1/16W
R668	1-216-835-11	METAL CHIP	15K	5%	1/16W
R669	1-216-835-11	METAL CHIP	15K	5%	1/16W
R670	1-216-845-11	METAL CHIP	100K	5%	1/16W
R671	1-216-845-11	METAL CHIP	100K	5%	1/16W
R672	1-216-845-11	METAL CHIP	100K	5%	1/16W
R673	1-216-821-11	METAL CHIP	1K	5%	1/16W
R674	1-216-845-11	METAL CHIP	100K	5%	1/16W
R675	1-216-821-11	METAL CHIP	1K	5%	1/16W
R676	1-216-857-11	METAL CHIP	1M	5%	1/16W
R679	1-216-864-11	METAL CHIP	0	5%	1/16W
R681	1-216-864-11	METAL CHIP	0	5%	1/16W
R683	1-216-864-11	METAL CHIP	0	5%	1/16W
R685	1-216-864-11	METAL CHIP	0	5%	1/16W

## &lt; SENSOR &gt;

SE650 1-810-725-81 SENSOR, ANGULAR VELOCITY  
SE651 1-810-725-71 SENSOR, ANGULAR VELOCITY

## &lt; VIBRATOR &gt;

X650 1-579-553-11 VIBRATOR

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
	A-7092-572-A	VC-167P BOARD, COMPLETE (TR330E)		C148	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
	*****			C149	1-164-227-11	CERAMIC CHIP	0.022uF 10% 25V
	A-7092-616-A	VC-167P BOARD, COMPLETE (TR510E)		C150	1-162-919-11	CERAMIC CHIP	22PF 5% 50V
	*****			C152	1-164-227-11	CERAMIC CHIP	0.022uF 10% 25V
	(Ref.No.1,000 Series)			C153	1-162-916-11	CERAMIC CHIP	12PF 5% 50V
	< CAPACITOR >			C154	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C061	1-104-852-11	TANTAL. CHIP	22uF 20% 6.3V	C155	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C072	1-164-156-11	CERAMIC CHIP	0.1uF 25V	C156	1-164-227-11	CERAMIC CHIP	0.022uF 10% 25V
C073	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V	C157	1-162-921-11	CERAMIC CHIP	33PF 5% 50V
C075	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C160	1-109-982-11	CERAMIC CHIP	1uF 10% 10V
C076	1-164-156-11	CERAMIC CHIP	0.1uF 25V	C162	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C077	1-164-346-11	CERAMIC CHIP	1uF 16V	C163	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C078	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V	C164	1-162-922-11	CERAMIC CHIP	39PF 5% 50V
C101	1-162-919-11	CERAMIC CHIP	22PF 5% 50V	C165	1-162-920-11	CERAMIC CHIP	27PF 5% 50V
C102	1-162-919-11	CERAMIC CHIP	22PF 5% 50V	C166	1-162-958-11	CERAMIC CHIP	270PF 5% 50V
C103	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C167	1-162-927-11	CERAMIC CHIP	100PF 5% 50V
C104	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C168	1-162-923-11	CERAMIC CHIP	47PF 5% 50V
C106	1-164-004-11	CERAMIC CHIP	0.1uF 10% 25V	C169	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C107	1-162-927-11	CERAMIC CHIP	100PF 5% 50V	C170	1-109-982-11	CERAMIC CHIP	1uF 10% 10V
C108	1-162-926-11	CERAMIC CHIP	82PF 5% 50V	C171	1-164-505-11	CERAMIC CHIP	2.2uF 16V
C109	1-162-927-11	CERAMIC CHIP	100PF 5% 50V	C202	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V
C110	1-164-217-11	CERAMIC CHIP	150PF 5% 50V	C203	1-165-176-11	CERAMIC CHIP	0.047uF 10% 16V (TR330E)
C111	1-164-156-11	CERAMIC CHIP	0.1uF 25V	C204	1-164-156-11	CERAMIC CHIP	0.1uF 25V
C112	1-110-569-11	TANTAL. CHIP	47uF 20% 6.3V	C205	1-109-982-11	CERAMIC CHIP	1uF 10% 10V
C113	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C206	1-109-982-11	CERAMIC CHIP	1uF 10% 10V
C114	1-164-227-11	CERAMIC CHIP	0.022uF 10% 25V	C207	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C115	1-164-227-11	CERAMIC CHIP	0.022uF 10% 25V	C208	1-164-005-11	CERAMIC CHIP	0.47uF 25V
C116	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C209	1-109-982-11	CERAMIC CHIP	1uF 10% 10V
C117	1-164-156-11	CERAMIC CHIP	0.1uF 25V	C210	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V
C118	1-110-569-11	TANTAL. CHIP	47uF 20% 6.3V	C211	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C119	1-162-959-11	CERAMIC CHIP	330PF 5% 50V	C212	1-164-005-11	CERAMIC CHIP	0.47uF 25V
C120	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C213	1-104-852-11	TANTAL. CHIP	22uF 20% 6.3V
C121	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V	C214	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C122	1-162-959-11	CERAMIC CHIP	330PF 5% 50V	C215	1-164-005-11	CERAMIC CHIP	0.47uF 25V
C123	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C216	1-126-246-11	ELECT CHIP	220uF 20% 4V
C124	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C217	1-135-149-21	TANTALUM CHIP	2.2uF 20% 10V
C125	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V	C218	1-162-927-11	CERAMIC CHIP	100PF 5% 50V
C127	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C219	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V
C128	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C220	1-162-920-11	CERAMIC CHIP	27PF 5% 50V
C129	1-164-156-11	CERAMIC CHIP	0.1uF 25V	C223	1-164-156-11	CERAMIC CHIP	0.1uF 25V
C130	1-162-968-11	CERAMIC CHIP	0.0047uF 10% 50V	C224	1-164-005-11	CERAMIC CHIP	0.47uF 25V
C134	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C225	1-162-928-11	CERAMIC CHIP	120PF 5% 50V
C135	1-104-852-11	TANTAL. CHIP	22uF 20% 6.3V	C226	1-164-315-11	CERAMIC CHIP	470PF 2% 50V
C136	1-164-156-11	CERAMIC CHIP	0.1uF 25V	C227	1-104-847-11	TANTAL. CHIP	22uF 20% 4V
C137	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C228	1-165-176-11	CERAMIC CHIP	0.047uF 10% 16V (TR510E)
C138	1-162-958-11	CERAMIC CHIP	270PF 5% 50V	C229	1-162-959-11	CERAMIC CHIP	330PF 5% 50V
C139	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C230	1-164-392-11	CERAMIC CHIP	390PF 5% 50V
C140	1-162-918-11	CERAMIC CHIP	18PF 5% 50V	C231	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V
C141	1-162-966-11	CERAMIC CHIP	0.0022uF 10% 50V	C232	1-164-156-11	CERAMIC CHIP	0.1uF 25V
C142	1-162-958-11	CERAMIC CHIP	270PF 5% 50V	C234	1-135-149-21	TANTALUM CHIP	2.2uF 20% 10V
C143	1-162-918-11	CERAMIC CHIP	18PF 5% 50V				



# VC-167P

Ref. No.	Part No.	Description	Remarks				Ref. No.	Part No.	Description	Remarks			
C235	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V		C431	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V	
C236	1-135-091-91	TANTAL. CHIP	1uF	20%	16V		C432	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V	
C237	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V		C433	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V	
C238	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V		C434	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C240	1-109-982-11	CERAMIC CHIP	1uF	10%	10V		C435	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V	
C242	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V		C436	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C243	1-162-916-11	CERAMIC CHIP	12PF	5%	50V		C437	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C244	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V		C438	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C246	1-135-073-00	TANTALUM CHIP	0.33uF	10%	35V		C439	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C247	1-162-927-11	CERAMIC CHIP	100PF	5%	50V		C441	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C248	1-162-923-11	CERAMIC CHIP	47PF	5%	50V		C442	1-165-112-11	CERAMIC CHIP	0.33uF		16V	
C249	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V		C443	1-162-957-11	CERAMIC CHIP	220PF	5%	50V	
C252	1-104-847-11	TANTAL. CHIP	22uF	20%	4V		C444	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C254	1-162-917-11	CERAMIC CHIP	15PF	5%	50V		C445	1-164-156-11	CERAMIC CHIP	0.1uF		25V	
C256	1-165-112-11	CERAMIC CHIP	0.33uF		16V		C446	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C257	1-164-156-11	CERAMIC CHIP	0.1uF		25V		C447	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C260	1-109-982-11	CERAMIC CHIP	1uF	10%	10V		C448	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V	
C261	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V		C449	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V	
C263	1-162-920-11	CERAMIC CHIP	27PF	5%	50V (TR330E)		C450	1-107-682-11	CERAMIC CHIP	1uF	10%	16V	
C265	1-162-926-11	CERAMIC CHIP	82PF	5%	50V (TR330E)		C451	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C266	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V (TR330E)		C452	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V	
C400	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V		C453	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V	
C401	1-162-913-11	CERAMIC CHIP	8PF	0.5PF	50V		C456	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C402	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V		C458	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C403	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V		C502	1-164-232-11	CERAMIC CHIP	0.01uF		50V	
C404	1-107-682-11	CERAMIC CHIP	1uF	10%	16V		C511	1-135-180-21	TANTALUM CHIP	3.3uF	20%	6.3V	
C405	1-162-907-11	CERAMIC CHIP	2PF	0.25PF	50V		C512	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V	
C406	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V		C515	1-104-847-11	TANTAL. CHIP	22uF	20%	4V	
C407	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V		C518	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C408	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V		C520	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C409	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V		C521	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C411	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V		C522	1-162-965-11	CERAMIC CHIP	0.0015uF	10%	50V	
C412	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V		C523	1-124-778-00	ELECT CHIP	22uF	20%	6.3V	
C413	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V		C526	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C414	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V		C529	1-104-847-11	TANTAL. CHIP	22uF	20%	4V	
C415	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V		C530	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	
C416	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V		C531	1-104-852-11	TANTAL. CHIP	22uF	20%	6.3V	
C417	1-162-957-11	CERAMIC CHIP	220PF	5%	50V		C532	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V	
C418	1-162-957-11	CERAMIC CHIP	220PF	5%	50V		C533	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C419	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V		C535	1-104-847-11	TANTAL. CHIP	22uF	20%	4V	
C420	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V		C537	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V	
C421	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V		C542	1-107-823-11	CERAMIC CHIP	0.47uF	10%	16V	
C423	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V		C543	1-104-908-11	TANTAL. CHIP	47uF	20%	4V	
C424	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V		C546	1-126-209-11	ELECT	100uF	20%	4V	
C425	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V		C548	1-104-847-11	TANTAL. CHIP	22uF	20%	4V	
C426	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V		C550	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V	
C427	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V		C556	1-135-149-21	TANTALUM CHIP	2.2uF	20%	10V	
C428	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V		C557	1-164-232-11	CERAMIC CHIP	0.01uF		50V	
C429	1-164-156-11	CERAMIC CHIP	0.1uF		25V		C558	1-107-823-11	CERAMIC CHIP	0.47uF	10%	16V	
C430	1-164-156-11	CERAMIC CHIP	0.1uF		25V		C561	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V	

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
C571	1-107-682-11	CERAMIC CHIP	1uF 10% 16V	C728	1-135-091-91	TANTAL. CHIP	1uF 20% 16V
C572	1-164-392-11	CERAMIC CHIP	390PF 5% 50V	C729	1-107-823-11	CERAMIC CHIP	0.47uF 10% 16V
C573	1-135-091-91	TANTAL. CHIP	1uF 20% 16V	C730	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C574	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V	C731	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C575	1-162-964-11	CERAMIC CHIP	0.001uF 10% 50V	C732	1-164-004-11	CERAMIC CHIP	0.1uF 10% 25V
C576	1-162-957-11	CERAMIC CHIP	220PF 5% 50V	C734	1-162-964-11	CERAMIC CHIP	0.001uF 10% 50V
C577	1-162-957-11	CERAMIC CHIP	220PF 5% 50V	C735	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V
C578	1-107-682-11	CERAMIC CHIP	1uF 10% 16V	C736	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C602	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C739	1-162-921-11	CERAMIC CHIP	33PF 5% 50V(TR330E)
C603	1-164-677-11	CERAMIC CHIP	0.033uF 10% 16V	C739	1-162-919-11	CERAMIC CHIP	22PF 5% 50V(TR510E)
C604	1-162-964-11	CERAMIC CHIP	0.001uF 10% 50V	C740	1-164-315-11	CERAMIC CHIP	470PF 2% 50V
C605	1-164-156-11	CERAMIC CHIP	0.1uF 25V	C741	1-135-148-21	TANTAL. CHIP	1.5uF 20% 10V
C606	1-164-227-11	CERAMIC CHIP	0.022uF 10% 25V	C742	1-164-156-11	CERAMIC CHIP	0.1uF 25V
C607	1-164-156-11	CERAMIC CHIP	0.1uF 25V	C745	1-164-156-11	CERAMIC CHIP	0.1uF 25V
C608	1-164-489-11	CERAMIC CHIP	0.22uF 10% 16V	C746	1-164-156-11	CERAMIC CHIP	0.1uF 25V
C609	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C749	1-135-181-21	TANTALUM CHIP	4.7uF 20% 6.3V
C610	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C750	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C611	1-135-181-21	TANTALUM CHIP	4.7uF 20% 6.3V	C751	1-164-346-11	CERAMIC CHIP	1uF 16V
C612	1-164-156-11	CERAMIC CHIP	0.1uF 25V	C755	1-164-346-11	CERAMIC CHIP	1uF 16V
C613	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C757	1-135-181-21	TANTALUM CHIP	4.7uF 20% 6.3V
C614	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	C758	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V
C615	1-162-964-11	CERAMIC CHIP	0.001uF 10% 50V	C759	1-164-156-11	CERAMIC CHIP	0.1uF 25V
C616	1-164-156-11	CERAMIC CHIP	0.1uF 25V	C760	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V(TR510E)
C618	1-164-156-11	CERAMIC CHIP	0.1uF 25V	C761	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V(TR510E)
C619	1-104-752-11	TANTAL. CHIP	33uF 20% 6.3V	C772	1-135-181-21	TANTALUM CHIP	4.7uF 20% 6.3V
C620	1-164-156-11	CERAMIC CHIP	0.1uF 25V	< CONNECTOR >			
C701	1-162-964-11	CERAMIC CHIP	0.001uF 10% 50V	CN060	1-691-350-21	CONNECTOR, FFC/FPC (ZIF) 12P	
C702	1-164-156-11	CERAMIC CHIP	0.1uF 25V	CN101	1-766-341-21	CONNECTOR, FFC/FPC 11P	
C703	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	CN102	1-764-708-21	CONNECTOR, FFC/FPC (LIF) 9P	
C704	1-164-346-11	CERAMIC CHIP	1uF 16V	CN300	1-774-054-21	CONNECTOR, FFC/FPC (ZIF) 45P	
C706	1-135-214-21	TANTAL. CHIP	4.7uF 20% 20V	* CN301	1-691-931-11	CONNECTOR, BOARD TO BOARD 38P	
C707	1-164-232-11	CERAMIC CHIP	0.01uF 50V	CN400	1-766-340-21	CONNECTOR, FFC/FPC 10P	
C708	1-164-232-11	CERAMIC CHIP	0.01uF 50V	CN401	1-766-342-21	CONNECTOR, FFC/FPC 12P	
C710	1-164-156-11	CERAMIC CHIP	0.1uF 25V	CN402	1-766-345-21	CONNECTOR, FFC/FPC 15P	
C711	1-164-156-11	CERAMIC CHIP	0.1uF 25V	CN403	1-766-644-21	CONNECTOR, FFC/FPC 8P	
C712	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	CN501	1-764-707-21	CONNECTOR, FFC/FPC (LIF) 8P	
C713	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V	CN601	1-764-529-11	CONNECTOR, FFC/FPC (ZIF) 22P	
C714	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V	CN701	1-750-630-11	CONNECTOR, FFC/FPC (ZIF) 16P	
C715	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	CN702	1-691-356-21	CONNECTOR, FFC/FPC (ZIF) 18P (TR510E)	
C717	1-162-964-11	CERAMIC CHIP	0.001uF 10% 50V	< DIODE >			
C718	1-162-919-11	CERAMIC CHIP	22PF 5% 50V(TR330E)	D101	8-719-404-49	DIODE MA111	
C718	1-162-921-11	CERAMIC CHIP	33PF 5% 50V(TR510E)	D102	8-719-820-41	DIODE 1SS302	
C719	1-164-489-11	CERAMIC CHIP	0.22uF 10% 16V	D103	8-719-027-50	DIODE MA142WK	
C720	1-162-923-11	CERAMIC CHIP	47PF 5% 50V	D201	8-719-027-50	DIODE MA142WK	
C722	1-162-964-11	CERAMIC CHIP	0.001uF 10% 50V	D202	8-719-404-49	DIODE MA111	
C724	1-162-924-11	CERAMIC CHIP	56PF 5% 50V(TR330E)	D203	8-719-027-48	DIODE MA142WA	
C724	1-162-920-11	CERAMIC CHIP	27PF 5% 50V(TR510E)	D302	8-719-404-49	DIODE MA111	
C725	1-162-970-11	CERAMIC CHIP	0.01uF 10% 25V	D319	8-719-033-13	DIODE CL-170Y-CD-T (DEW)	
C726	1-135-259-11	TANTAL. CHIP	10uF 20% 6.3V	D701	8-719-027-48	DIODE MA142WA	
C727	1-135-091-91	TANTAL. CHIP	1uF 20% 16V	D702	8-719-404-49	DIODE MA111	

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
D703	8-719-404-49	DIODE MA111		L202	1-412-064-11	INDUCTOR CHIP 100uH	
D705	8-719-002-81	DIODE 1T363-01-T8A		L203	1-412-959-11	INDUCTOR 47uH	
D706	8-713-102-28	DIODE 1T379-04-T8A		L207	1-412-963-11	INDUCTOR 100uH	
< IC >				L210	1-412-951-11	INDUCTOR 10uH (TR330E)	
IC061	8-759-362-34	IC MB88344BLPFV-ER		L211	1-412-058-11	INDUCTOR CHIP 10uH	
IC101	8-752-071-48	IC CXA2002R		L212	1-412-058-11	INDUCTOR CHIP 10uH	
IC201	8-752-071-47	IC CXA2001R		L213	1-414-196-41	INDUCTOR 47uH	
IC204	8-759-234-20	IC TC7S08F		L214	1-412-056-11	INDUCTOR CHIP 4.7uH	
IC400	8-752-858-50	IC CXP87460-005R		L400	1-412-058-11	INDUCTOR CHIP 10uH	
IC401	8-759-278-57	IC AK6420HF-E2		L401	1-412-959-11	INDUCTOR 47uH	
IC402	8-752-070-46	IC CXA1814Q		L570	1-414-078-11	INDUCTOR 10uH	
IC403	8-759-327-67	IC LB1950V-TLM		L601	1-412-058-11	INDUCTOR CHIP 10uH	
IC404	8-759-327-62	IC TA8482FN-EL		L602	1-412-058-11	INDUCTOR CHIP 10uH	
IC405	8-759-234-20	IC TC7S08F		L603	1-412-951-11	INDUCTOR 10uH	
IC501	8-759-338-93	IC AN3996FHP-EB		L701	1-412-058-11	INDUCTOR CHIP 10uH	
IC570	8-759-334-09	IC CXA2003N-T4		L703	1-414-078-11	INDUCTOR 10uH	
IC601	8-759-701-01	IC NJM2904E		L704	1-412-058-11	INDUCTOR CHIP 10uH	
IC602	8-759-337-41	IC NJM2902V		L706	1-412-058-11	INDUCTOR CHIP 10uH	
IC603	8-759-247-07	IC MPC17A34VMEL		L707	1-412-979-21	INDUCTOR 1uH	
IC604	8-752-365-65	IC CXD2126N-T4		L708	1-412-979-21	INDUCTOR 1uH	
IC701	8-752-372-14	IC CXD1267AN		L709	1-412-052-21	INDUCTOR CHIP 1uH	
IC702	8-752-374-25	IC CXD2415R-T4		L710	1-412-052-21	INDUCTOR CHIP 1uH	
IC703	8-752-073-11	IC CXA2006Q-T4		L712	1-414-078-11	INDUCTOR 10uH	
IC704	8-752-375-80	IC CXD2312R		L714	1-412-058-11	INDUCTOR CHIP 10uH	
IC705	8-752-374-02	IC CXD2418R		L715	1-414-078-11	INDUCTOR 10uH	
IC706	8-759-349-58	IC CXD8562R		L716	1-414-078-11	INDUCTOR 10uH (TR510E)	
IC707	8-759-297-76	IC CXD2152AREL (TR510E)		L751	1-414-078-11	INDUCTOR 10uH	
IC708	8-759-337-40	IC NJM2904V		< TRANSISTOR >			
IC709	8-759-198-34	IC TA75S558F		Q061	8-729-101-07	TRANSISTOR 2SB798-DL	
IC710	8-759-198-34	IC TA75S558F		Q062	8-729-230-63	TRANSISTOR 2SC4116YG	
< COIL >				Q063	8-729-230-63	TRANSISTOR 2SC4116YG	
L061	1-412-064-11	INDUCTOR CHIP 100uH		Q064	8-729-230-63	TRANSISTOR 2SC4116YG	
L062	1-414-078-11	INDUCTOR 10uH		Q065	8-729-230-63	TRANSISTOR 2SC4116YG	
L063	1-412-052-21	INDUCTOR CHIP 1uH		Q101	8-729-230-63	TRANSISTOR 2SC4116YG	
L101	1-412-066-21	INDUCTOR CHIP 220uH		Q102	8-729-402-48	TRANSISTOR UN521E	
L102	1-412-066-21	INDUCTOR CHIP 220uH		Q103	8-729-230-63	TRANSISTOR 2SC4116YG	
L103	1-412-066-21	INDUCTOR CHIP 220uH		Q104	8-729-230-63	TRANSISTOR 2SC4116YG	
L104	1-412-952-11	INDUCTOR 12uH		Q105	8-729-420-24	TRANSISTOR 2SB1218A-QRS	
L105	1-412-060-11	INDUCTOR CHIP 22uH		Q106	8-729-905-23	TRANSISTOR 2SA1576-R (TR510E)	
L106	1-412-957-11	INDUCTOR 33uH		Q107	8-729-824-02	TRANSISTOR 2SA1838	
L107	1-412-280-31	INDUCTOR 330uH		Q108	8-729-402-42	TRANSISTOR UN5213	
L108	1-412-282-41	INDUCTOR 470uH		Q109	8-729-402-42	TRANSISTOR UN5213	
L109	1-412-355-41	INDUCTOR 180uH		Q110	8-729-012-50	TRANSISTOR 2SC4400-3/4/5	
L113	1-414-078-11	INDUCTOR 10uH		Q111	8-729-230-63	TRANSISTOR 2SC4116YG	
L114	1-412-355-41	INDUCTOR 180uH		Q112	8-729-230-63	TRANSISTOR 2SC4116YG	
L115	1-412-957-11	INDUCTOR 33uH		Q113	8-729-230-63	TRANSISTOR 2SC4116YG	
L116	1-414-078-11	INDUCTOR 10uH		Q114	8-729-402-42	TRANSISTOR UN5213	
L118	1-414-373-61	INDUCTOR CHIP 10uH		Q120	8-729-403-35	TRANSISTOR UN5113	
L119	1-412-950-11	INDUCTOR 8.2uH					
L120	1-410-658-31	INDUCTOR CHIP 220uH					
L121	1-410-655-31	INDUCTOR CHIP 120uH					

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
Q123	8-729-015-74	TRANSISTOR	UN5111	R084	1-216-826-11	METAL CHIP	2.7K 5% 1/16W
Q124	8-729-117-73	TRANSISTOR	2SC4178-F14	R085	1-216-826-11	METAL CHIP	2.7K 5% 1/16W
Q125	8-729-230-63	TRANSISTOR	2SC4116YG	R086	1-216-834-11	METAL CHIP	12K 5% 1/16W
Q126	8-729-402-42	TRANSISTOR	UN5213	R087	1-216-832-11	METAL CHIP	8.2K 5% 1/16W
Q129	8-729-420-24	TRANSISTOR	2SB1218A-QRS	R088	1-216-823-11	METAL CHIP	1.5K 5% 1/16W
Q130	8-729-012-50	TRANSISTOR	2SC4400-3/4/5	R091	1-216-841-11	METAL CHIP	47K 5% 1/16W
Q131	8-729-420-24	TRANSISTOR	2SB1218A-QRS	R092	1-216-841-11	METAL CHIP	47K 5% 1/16W
Q202	8-729-230-63	TRANSISTOR	2SC4116YG	R101	1-216-832-11	METAL CHIP	8.2K 5% 1/16W
Q206	8-729-420-24	TRANSISTOR	2SB1218A-QRS	R102	1-216-815-11	METAL CHIP	330 5% 1/16W
Q212	8-729-420-24	TRANSISTOR	2SB1218A-QRS	R103	1-216-815-11	METAL CHIP	330 5% 1/16W
Q213	8-729-402-42	TRANSISTOR	UN5213	R104	1-216-797-11	METAL CHIP	10 5% 1/16W
Q214	8-729-420-24	TRANSISTOR	2SB1218A-QRS	R105	1-216-821-11	METAL CHIP	1K 5% 1/16W
Q215	8-729-013-15	TRANSISTOR	2SC4909	R106	1-218-875-11	METAL CHIP	15K 0.50% 1/16W
Q216	8-729-420-20	TRANSISTOR	XN4312	R107	1-216-836-11	METAL CHIP	18K 5% 1/16W
Q217	8-729-420-12	TRANSISTOR	XN4213	R108	1-216-864-11	METAL CHIP	0 5% 1/16W
Q218	8-729-420-24	TRANSISTOR	2SB1218A-QRS	R109	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
Q219	8-729-230-63	TRANSISTOR	2SC4116YG	R110	1-216-836-11	METAL CHIP	18K 5% 1/16W
Q221	8-729-402-42	TRANSISTOR	UN5213	R111	1-216-831-11	METAL CHIP	6.8K 5% 1/16W
Q222	8-729-402-42	TRANSISTOR	UN5213	R112	1-216-837-11	METAL CHIP	22K 5% 1/16W
Q223	8-729-230-63	TRANSISTOR	2SC4116YG (TR330E)	R113	1-216-837-11	METAL CHIP	22K 5% 1/16W
Q224	8-729-420-24	TRANSISTOR	2SB1218A-QRS (TR330E)	R114	1-216-833-11	METAL CHIP	10K 5% 1/16W
Q226	8-729-230-63	TRANSISTOR	2SC4116YG	R115	1-216-864-11	METAL CHIP	0 5% 1/16W
Q303	8-729-015-76	TRANSISTOR	UN5211	R116	1-216-853-11	METAL CHIP	470K 5% 1/16W
Q400	8-729-230-63	TRANSISTOR	2SC4116YG	R117	1-216-847-11	METAL CHIP	150K 5% 1/16W
Q401	8-729-230-63	TRANSISTOR	2SC4116YG	R118	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
Q501	8-729-420-53	TRANSISTOR	UN5115	R119	1-216-825-11	METAL CHIP	2.2K 5% 1/16W
Q507	8-729-421-26	TRANSISTOR	UN5216QRS	R120	1-216-839-11	METAL CHIP	33K 5% 1/16W
Q570	8-729-402-42	TRANSISTOR	UN5213	R121	1-216-836-11	METAL CHIP	18K 5% 1/16W
Q601	8-729-230-63	TRANSISTOR	2SC4116YG	R122	1-216-818-11	METAL CHIP	560 5% 1/16W
Q602	8-729-230-63	TRANSISTOR	2SC4116YG	R123	1-216-815-11	METAL CHIP	330 5% 1/16W
Q603	8-729-420-53	TRANSISTOR	UN5115	R125	1-216-821-11	METAL CHIP	1K 5% 1/16W
Q701	8-729-403-27	TRANSISTOR	XN4401	R126	1-216-797-11	METAL CHIP	10 5% 1/16W
Q703	8-729-402-42	TRANSISTOR	UN5213	R127	1-216-837-11	METAL CHIP	22K 5% 1/16W
Q704	8-729-403-35	TRANSISTOR	UN5113	R128	1-216-837-11	METAL CHIP	22K 5% 1/16W
Q705	8-729-403-35	TRANSISTOR	UN5113	R129	1-216-819-11	METAL CHIP	680 5% 1/16W
Q706	8-729-402-42	TRANSISTOR	UN5213	R130	1-216-835-11	METAL CHIP	15K 5% 1/16W
Q750	8-729-420-24	TRANSISTOR	2SB1218A-QRS	R131	1-216-839-11	METAL CHIP	33K 5% 1/16W
Q752	8-729-420-24	TRANSISTOR	2SB1218A-QRS	R132	1-216-813-11	METAL CHIP	220 5% 1/16W
< RESISTOR >				R133	1-216-818-11	METAL CHIP	560 5% 1/16W
R060	1-216-864-11	METAL CHIP	0 5% 1/16W	R134	1-216-821-11	METAL CHIP	1K 5% 1/16W
R061	1-216-864-11	METAL CHIP	0 5% 1/16W	R135	1-216-864-11	METAL CHIP	0 5% 1/16W
R062	1-216-864-11	METAL CHIP	0 5% 1/16W	R136	1-216-864-11	METAL CHIP	0 5% 1/16W
R077	1-216-138-00	METAL CHIP	3.3 5% 1/8W	R141	1-216-816-11	METAL CHIP	390 5% 1/16W
R078	1-216-830-11	METAL CHIP	5.6K 5% 1/16W	R149	1-216-821-11	METAL CHIP	1K 5% 1/16W
R079	1-216-820-11	METAL CHIP	820 5% 1/16W	R150	1-216-826-11	METAL CHIP	2.7K 5% 1/16W
R080	1-216-836-11	METAL CHIP	18K 5% 1/16W	R152	1-216-834-11	METAL CHIP	12K 5% 1/16W
R081	1-216-818-11	METAL CHIP	560 5% 1/16W	R153	1-216-833-11	METAL CHIP	10K 5% 1/16W
R082	1-216-822-11	METAL CHIP	1.2K 5% 1/16W	R154	1-216-817-11	METAL CHIP	470 5% 1/16W
R083	1-216-837-11	METAL CHIP	22K 5% 1/16W	R155	1-216-807-11	METAL CHIP	68 5% 1/16W
				R156	1-216-827-11	METAL CHIP	3.3K 5% 1/16W

# VC-167P

Ref. No.	Part No.	Description	Remarks			Ref. No.	Part No.	Description	Remarks		
R157	1-216-816-11	METAL CHIP	390	5%	1/16W	R213	1-216-841-11	METAL CHIP	47K	5%	1/16W
R158	1-216-819-11	METAL CHIP	680	5%	1/16W	R214	1-216-807-11	METAL CHIP	68	5%	1/16W
R159	1-216-830-11	METAL CHIP	5.6K	5%	1/16W	R215	1-216-821-11	METAL CHIP	1K	5%	1/16W
R160	1-216-821-11	METAL CHIP	1K	5%	1/16W	R216	1-216-821-11	METAL CHIP	1K	5%	1/16W
R161	1-216-864-11	METAL CHIP	0	5%	1/16W	R218	1-218-879-11	METAL CHIP	22K	0.50%	1/16W
R162	1-216-835-11	METAL CHIP	15K	5%	1/16W	R219	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R163	1-216-840-11	METAL CHIP	39K	5%	1/16W	R220	1-216-833-11	METAL CHIP	10K	5%	1/16W
R164	1-216-864-11	METAL CHIP	0	5%	1/16W	R221	1-216-833-11	METAL CHIP	10K	5%	1/16W
R165	1-216-845-11	METAL CHIP	100K	5%	1/16W	R222	1-216-821-11	METAL CHIP	1K	5%	1/16W
R166	1-216-836-11	METAL CHIP	18K	5%	1/16W	R223	1-216-821-11	METAL CHIP	1K	5%	1/16W
R167	1-216-836-11	METAL CHIP	18K	5%	1/16W	R224	1-216-864-11	METAL CHIP	0	5%	1/16W
R168	1-216-821-11	METAL CHIP	1K	5%	1/16W	R225	1-216-833-11	METAL CHIP	10K	5%	1/16W
R169	1-216-804-11	METAL CHIP	39	5%	1/16W	R227	1-216-821-11	METAL CHIP	1K	5%	1/16W
R170	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	R228	1-216-822-11	METAL CHIP	1.2K	5%	1/16W
R171	1-216-840-11	METAL CHIP	39K	5%	1/16W	R229	1-218-863-11	METAL CHIP	4.7K	0.50%	1/16W
R172	1-216-835-11	METAL CHIP	15K	5%	1/16W	R230	1-216-821-11	METAL CHIP	1K	5%	1/16W
R173	1-216-864-11	METAL CHIP	0	5%	1/16W	R232	1-216-821-11	METAL CHIP	1K	5%	1/16W
R176	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	R234	1-218-849-11	METAL CHIP	1.2K	0.50%	1/16W
R177	1-216-821-11	METAL CHIP	1K	5%	1/16W	R235	1-216-821-11	METAL CHIP	1K	5%	1/16W
R178	1-216-821-11	METAL CHIP	1K	5%	1/16W	R236	1-216-864-11	METAL CHIP	0	5%	1/16W
R179	1-216-817-11	METAL CHIP	470	5%	1/16W	R238	1-216-864-11	METAL CHIP	0	5%	1/16W
R180	1-216-818-11	METAL CHIP	560	5%	1/16W	R239	1-216-864-11	METAL CHIP	0	5%	1/16W
R181	1-216-818-11	METAL CHIP	560	5%	1/16W	R241	1-218-839-11	METAL GLAZE	470	0.50%	1/16W
R182	1-216-809-11	METAL CHIP	100	5%	1/16W	R243	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R183	1-216-818-11	METAL CHIP	560	5%	1/16W	R247	1-216-833-11	METAL CHIP	10K	5%	1/16W
R184	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	R248	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R185	1-216-818-11	METAL CHIP	560	5%	1/16W	R249	1-216-824-11	METAL CHIP	1.8K	5%	1/16W
R186	1-216-818-11	METAL CHIP	560	5%	1/16W	R254	1-216-841-11	METAL CHIP	47K	5%	1/16W
R187	1-216-823-11	METAL CHIP	1.5K	5%	1/16W	R255	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R188	1-216-837-11	METAL CHIP	22K	5%	1/16W	R256	1-216-833-11	METAL CHIP	10K	5%	1/16W
R189	1-216-837-11	METAL CHIP	22K	5%	1/16W	R257	1-216-821-11	METAL CHIP	1K	5%	1/16W
R190	1-216-837-11	METAL CHIP	22K	5%	1/16W	R259	1-216-833-11	METAL CHIP	10K	5%	1/16W
R191	1-216-839-11	METAL CHIP	33K	5%	1/16W	R260	1-216-817-11	METAL CHIP	470	5%	1/16W
R192	1-216-814-11	METAL CHIP	270	5%	1/16W	R261	1-216-841-11	METAL CHIP	47K	5%	1/16W
R193	1-216-813-11	METAL CHIP	220	5%	1/16W	R262	1-216-837-11	METAL CHIP	22K	5%	1/16W
R194	1-216-806-11	METAL GLAZE	56	5%	1/16W	R265	1-216-821-11	METAL CHIP	1K	5%	1/16W (TR330E)
R195	1-216-809-11	METAL CHIP	100	5%	1/16W	R266	1-216-864-11	METAL CHIP	0	5%	1/16W
R196	1-216-818-11	METAL CHIP	560	5%	1/16W	R267	1-216-864-11	METAL CHIP	0	5%	1/16W
R197	1-216-864-11	METAL CHIP	0	5%	1/16W	R268	1-216-818-11	METAL CHIP	560	5%	1/16W (TR330E)
R201	1-216-833-11	METAL CHIP	10K	5%	1/16W	R270	1-216-817-11	METAL CHIP	470	5%	1/16W
R202	1-216-836-11	METAL CHIP	18K	5%	1/16W (TR330E)	R271	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R202	1-216-864-11	METAL CHIP	0	5%	1/16W (TR510E)	R272	1-216-823-11	METAL CHIP	1.5K	5%	1/16W
R203	1-216-832-11	METAL CHIP	8.2K	5%	1/16W (TR330E)	R273	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R204	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	R274	1-216-821-11	METAL CHIP	1K	5%	1/16W
R205	1-216-864-11	METAL CHIP	0	5%	1/16W	R276	1-216-864-11	METAL CHIP	0	5%	1/16W
R207	1-216-864-11	METAL CHIP	0	5%	1/16W	R277	1-216-819-11	METAL CHIP	680	5%	1/16W
R210	1-216-864-11	METAL CHIP	0	5%	1/16W (TR330E)	R279	1-216-823-11	METAL CHIP	1.5K	5%	1/16W (TR330E)
R210	1-216-836-11	METAL CHIP	18K	5%	1/16W (TR510E)	R281	1-216-823-11	METAL CHIP	1.5K	5%	1/16W
R211	1-216-828-11	METAL CHIP	3.9K	5%	1/16W (TR510E)	R282	1-216-823-11	METAL CHIP	1.5K	5%	1/16W (TR510E)
R212	1-216-841-11	METAL CHIP	47K	5%	1/16W	R283	1-216-819-11	METAL CHIP	680	5%	1/16W (TR330E)

Ref. No.	Part No.	Description	Remarks			Ref. No.	Part No.	Description	Remarks		
R284	1-216-819-11	METAL CHIP	680	5%	1/16W (TR330E)	R425	1-216-833-11	METAL CHIP	10K	5%	1/16W
R286	1-216-836-11	METAL CHIP	18K	5%	1/16W (TR330E)	R426	1-216-833-11	METAL CHIP	10K	5%	1/16W
R287	1-216-864-11	METAL CHIP	0	5%	1/16W (TR330E)	R427	1-216-849-11	METAL CHIP	220K	5%	1/16W
R289	1-216-839-11	METAL CHIP	33K	5%	1/16W (TR330E)	R428	1-216-841-11	METAL CHIP	47K	5%	1/16W
R290	1-216-864-11	METAL CHIP	0	5%	1/16W	R429	1-216-800-11	METAL GLAZE	18	5%	1/16W
R291	1-216-864-11	METAL CHIP	0	5%	1/16W	R430	1-216-821-11	METAL CHIP	1K	5%	1/16W
R301	1-216-833-11	METAL CHIP	10K	5%	1/16W	R434	1-216-835-11	METAL CHIP	15K	5%	1/16W
R302	1-216-833-11	METAL CHIP	10K	5%	1/16W	R436	1-216-845-11	METAL CHIP	100K	5%	1/16W
R303	1-216-841-11	METAL CHIP	47K	5%	1/16W	R437	1-216-841-11	METAL CHIP	47K	5%	1/16W
R304	1-216-841-11	METAL CHIP	47K	5%	1/16W	R439	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R305	1-216-841-11	METAL CHIP	47K	5%	1/16W	R440	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R307	1-216-833-11	METAL CHIP	10K	5%	1/16W	R441	1-216-837-11	METAL CHIP	22K	5%	1/16W
R314	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	R442	1-216-845-11	METAL CHIP	100K	5%	1/16W
R315	1-218-290-11	METAL GLAZE	6.2K	5%	1/16W	R444	1-216-837-11	METAL CHIP	22K	5%	1/16W
R316	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	R445	1-216-864-11	METAL CHIP	0	5%	1/16W
R317	1-218-290-11	METAL GLAZE	6.2K	5%	1/16W	R446	1-216-836-11	METAL CHIP	18K	5%	1/16W
R318	1-216-836-11	METAL CHIP	18K	5%	1/16W	R447	1-216-833-11	METAL CHIP	10K	5%	1/16W
R319	1-216-853-11	METAL CHIP	470K	5%	1/16W	R448	1-216-833-11	METAL CHIP	10K	5%	1/16W
R320	1-216-853-11	METAL CHIP	470K	5%	1/16W	R449	1-216-833-11	METAL CHIP	10K	5%	1/16W
R321	1-216-853-11	METAL CHIP	470K	5%	1/16W	R450	1-216-833-11	METAL CHIP	10K	5%	1/16W
R327	1-216-853-11	METAL CHIP	470K	5%	1/16W	R451	1-216-845-11	METAL CHIP	100K	5%	1/16W
R328	1-216-853-11	METAL CHIP	470K	5%	1/16W	R452	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R329	1-216-833-11	METAL CHIP	10K	5%	1/16W	R453	1-217-671-11	METAL CHIP	1	5%	1/10W
R330	1-216-833-11	METAL CHIP	10K	5%	1/16W	R454	1-217-671-11	METAL CHIP	1	5%	1/10W
R333	1-216-864-11	METAL CHIP	0	5%	1/16W	R455	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R334	1-208-766-11	METAL GLAZE	220	0.50%	1/10W	R456	1-216-841-11	METAL CHIP	47K	5%	1/16W
R400	1-216-845-11	METAL CHIP	100K	5%	1/16W	R458	1-217-671-11	METAL CHIP	1	5%	1/10W
R401	1-216-845-11	METAL CHIP	100K	5%	1/16W	R459	1-217-671-11	METAL CHIP	1	5%	1/10W
R402	1-216-845-11	METAL CHIP	100K	5%	1/16W	R460	1-217-671-11	METAL CHIP	1	5%	1/10W
R403	1-216-845-11	METAL CHIP	100K	5%	1/16W	R461	1-216-845-11	METAL CHIP	100K	5%	1/16W
R404	1-216-845-11	METAL CHIP	100K	5%	1/16W	R462	1-216-833-11	METAL CHIP	10K	5%	1/16W
R405	1-216-845-11	METAL CHIP	100K	5%	1/16W	R463	1-216-833-11	METAL CHIP	10K	5%	1/16W
R406	1-216-833-11	METAL CHIP	10K	5%	1/16W	R464	1-216-833-11	METAL CHIP	10K	5%	1/16W
R407	1-216-841-11	METAL CHIP	47K	5%	1/16W	R465	1-216-808-11	METAL CHIP	82	5%	1/16W
R408	1-216-821-11	METAL CHIP	1K	5%	1/16W	R466	1-216-845-11	METAL CHIP	100K	5%	1/16W
R409	1-216-821-11	METAL CHIP	1K	5%	1/16W	R467	1-216-019-00	METAL CHIP	56	5%	1/10W
R410	1-216-821-11	METAL CHIP	1K	5%	1/16W	R468	1-216-833-11	METAL CHIP	10K	5%	1/16W
R411	1-216-864-11	METAL CHIP	0	5%	1/16W	R469	1-216-833-11	METAL CHIP	10K	5%	1/16W
R412	1-216-821-11	METAL CHIP	1K	5%	1/16W	R471	1-216-821-11	METAL CHIP	1K	5%	1/16W
R413	1-216-821-11	METAL CHIP	1K	5%	1/16W	R472	1-216-833-11	METAL CHIP	10K	5%	1/16W
R414	1-216-821-11	METAL CHIP	1K	5%	1/16W	R473	1-216-833-11	METAL CHIP	10K	5%	1/16W
R417	1-216-821-11	METAL CHIP	1K	5%	1/16W	R474	1-216-821-11	METAL CHIP	1K	5%	1/16W
R418	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	R475	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R419	1-216-845-11	METAL CHIP	100K	5%	1/16W	R476	1-216-845-11	METAL CHIP	100K	5%	1/16W
R420	1-216-833-11	METAL CHIP	10K	5%	1/16W	R477	1-216-841-11	METAL CHIP	47K	5%	1/16W
R421	1-216-821-11	METAL CHIP	1K	5%	1/16W	R478	1-216-821-11	METAL CHIP	1K	5%	1/16W
R422	1-216-845-11	METAL CHIP	100K	5%	1/16W	R479	1-216-817-11	METAL CHIP	470	5%	1/16W
R423	1-216-845-11	METAL CHIP	100K	5%	1/16W	R481	1-216-817-11	METAL CHIP	470	5%	1/16W
R424	1-216-821-11	METAL CHIP	1K	5%	1/16W	R482	1-216-817-11	METAL CHIP	470	5%	1/16W
						R501	1-216-830-11	METAL CHIP	5.6K	5%	1/16W

# VC-167P

Ref. No.	Part No.	Description	Remarks	Ref. No.	Part No.	Description	Remarks
R503	1-218-895-11	METAL CHIP	100K 0.50% 1/16W	R713	1-216-833-11	METAL CHIP	10K 5% 1/16W
R506	1-218-903-11	METAL CHIP	220K 0.50% 1/16W	R714	1-216-857-11	METAL CHIP	1M 5% 1/16W
R511	1-218-881-11	METAL CHIP	27K 0.50% 1/16W	R715	1-216-845-11	METAL CHIP	100K 5% 1/16W
R512	1-216-864-11	METAL CHIP	0 5% 1/16W	R717	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
R514	1-216-837-11	METAL CHIP	22K 5% 1/16W	R719	1-216-818-11	METAL CHIP	560 5% 1/16W
R515	1-216-829-11	METAL CHIP	4.7K 5% 1/16W	R720	1-216-818-11	METAL CHIP	560 5% 1/16W
R517	1-216-857-11	METAL CHIP	1M 5% 1/16W	R721	1-216-827-11	METAL CHIP	3.3K 5% 1/16W
R519	1-216-833-11	METAL CHIP	10K 5% 1/16W	R722	1-216-827-11	METAL CHIP	3.3K 5% 1/16W
R522	1-216-817-11	METAL CHIP	470 5% 1/16W	R723	1-216-818-11	METAL CHIP	560 5% 1/16W
R523	1-216-833-11	METAL CHIP	10K 5% 1/16W	R724	1-216-818-11	METAL CHIP	560 5% 1/16W
R531	1-216-817-11	METAL CHIP	470 5% 1/16W	R725	1-216-864-11	METAL CHIP	0 5% 1/16W
R556	1-216-853-11	METAL CHIP	470K 5% 1/16W	R726	1-216-846-11	METAL CHIP	120K 5% 1/16W
R570	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R727	1-216-839-11	METAL CHIP	33K 5% 1/16W
R571	1-218-871-11	METAL CHIP	10K 0.50% 1/16W	R728	1-216-853-11	METAL CHIP	470K 5% 1/16W
R575	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R729	1-216-864-11	METAL CHIP	0 5% 1/16W
R581	1-216-833-11	METAL CHIP	10K 5% 1/16W	R730	1-216-864-11	METAL CHIP	0 5% 1/16W
R601	1-216-001-00	METAL CHIP	10 5% 1/10W	R732	1-216-841-11	METAL CHIP	47K 5% 1/16W
R603	1-216-825-11	METAL CHIP	2.2K 5% 1/16W	R733	1-216-841-11	METAL CHIP	47K 5% 1/16W
R604	1-216-845-11	METAL CHIP	100K 5% 1/16W	R734	1-216-841-11	METAL CHIP	47K 5% 1/16W
R605	1-216-827-11	METAL CHIP	3.3K 5% 1/16W	R735	1-216-841-11	METAL CHIP	47K 5% 1/16W
R606	1-216-836-11	METAL CHIP	18K 5% 1/16W	R737	1-216-864-11	METAL CHIP	0 5% 1/16W (TR510E)
R607	1-216-848-11	METAL CHIP	180K 5% 1/16W	R740	1-216-839-11	METAL CHIP	33K 5% 1/16W
R608	1-216-848-11	METAL CHIP	180K 5% 1/16W	R741	1-216-841-11	METAL CHIP	47K 5% 1/16W
R609	1-216-848-11	METAL CHIP	180K 5% 1/16W	R742	1-216-837-11	METAL CHIP	22K 5% 1/16W
R610	1-216-830-11	METAL CHIP	5.6K 5% 1/16W	R743	1-216-839-11	METAL CHIP	33K 5% 1/16W
R611	1-216-815-11	METAL CHIP	330 5% 1/16W	R744	1-216-841-11	METAL CHIP	47K 5% 1/16W
R612	1-216-845-11	METAL CHIP	100K 5% 1/16W	R745	1-216-837-11	METAL CHIP	22K 5% 1/16W
R613	1-216-834-11	METAL CHIP	12K 5% 1/16W	R751	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
R614	1-216-834-11	METAL CHIP	12K 5% 1/16W	R756	1-216-864-11	METAL CHIP	0 5% 1/16W
R615	1-216-845-11	METAL CHIP	100K 5% 1/16W	R757	1-216-864-11	METAL CHIP	0 5% 1/16W
R616	1-216-837-11	METAL CHIP	22K 5% 1/16W	R758	1-216-833-11	METAL CHIP	10K 5% 1/16W
R618	1-216-837-11	METAL CHIP	22K 5% 1/16W	R759	1-216-836-11	METAL CHIP	18K 5% 1/16W
R619	1-216-837-11	METAL CHIP	22K 5% 1/16W	R775	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
R620	1-216-823-11	METAL CHIP	1.5K 5% 1/16W	< SWITCH >			
R621	1-216-833-11	METAL CHIP	10K 5% 1/16W	S301	1-692-088-41	SWITCH, TACTILE (EDIT SEARCH +)	
R623	1-216-864-11	METAL CHIP	0 5% 1/16W	S302	1-692-088-41	SWITCH, TACTILE (EDIT SEARCH -)	
R628	1-216-821-11	METAL CHIP	1K 5% 1/16W	S303	1-692-088-41	SWITCH, TACTILE (PLAY)	
R629	1-216-821-11	METAL CHIP	1K 5% 1/16W	S304	1-692-088-41	SWITCH, TACTILE (PAUSE)	
R630	1-216-841-11	METAL CHIP	47K 5% 1/16W	S305	1-692-088-41	SWITCH, TACTILE (REW)	
R631	1-216-841-11	METAL CHIP	47K 5% 1/16W	S306	1-692-088-41	SWITCH, TACTILE (FF)	
R632	1-216-848-11	METAL CHIP	180K 5% 1/16W	S307	1-692-088-41	SWITCH, TACTILE (STOP)	
R701	1-216-845-11	METAL CHIP	100K 5% 1/16W	< VIBRATOR >			
R702	1-216-845-11	METAL CHIP	100K 5% 1/16W	X400	1-760-315-11	VIBRATOR, CRYSTAL 11.718MHz	
R703	1-216-857-11	METAL CHIP	1M 5% 1/16W	X701	1-760-321-11	VIBRATOR, CRYSTAL 28.375MHz	
R704	1-216-845-11	METAL CHIP	100K 5% 1/16W	X702	1-579-780-21	VIBRATOR, CRYSTAL 17.7MHz	
R706	1-216-839-11	METAL CHIP	33K 5% 1/16W				
R707	1-216-845-11	METAL CHIP	100K 5% 1/16W				
R708	1-216-864-11	METAL CHIP	0 5% 1/16W				
R709	1-218-847-11	METAL CHIP	1K 0.50% 1/16W				
R710	1-218-876-11	METAL CHIP	16K 0.50% 1/16W				

Ref. No.	Part No.	Description	Remarks
	A-7072-357-A	VF-87P BOARD, COMPLETE	
		*****	
		(Ref.No.2,000 Series)	

## &lt; CAPACITOR &gt;

C901	1-131-388-00	TANTALUM	68uF	10%	6.3V
C902	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C903	1-135-091-91	TANTAL. CHIP	1uF	20%	16V
C904	1-162-965-11	CERAMIC CHIP	0.0015uF	10%	50V
C905	1-104-752-11	TANTAL. CHIP	33uF	20%	6.3V
C906	1-162-638-11	CERAMIC CHIP	1uF		16V
C907	1-137-306-11	FILM CHIP	0.1uF	5%	16V
C908	1-162-920-11	CERAMIC CHIP	27PF	5%	50V
△C910	1-164-758-11	CERAMIC CHIP	0.0039uF	5%	50V
△C911	1-164-715-11	CERAMIC CHIP	0.0068uF	5%	50V
C912	1-107-854-11	TANTAL. CHIP	68uF	20%	6.3V
C914	1-128-007-11	ELECT CHIP	2.2uF	20%	35V
C915	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C916	1-164-611-11	CERAMIC CHIP	0.001uF	10%	500V
C917	1-165-319-11	CERAMIC CHIP	0.1uF		50V

## &lt; CONNECTOR &gt;

CN901	1-566-537-11	CONNECTOR, FPC (NON ZIF) 5P
CN902	1-573-290-21	PIN, CONNECTOR (1.5MM) (SMD) 4P

## &lt; DIODE &gt;

D901	8-719-951-21	DIODE PR1102W
D903	8-719-404-49	DIODE MA111

## &lt; IC &gt;

IC901	8-759-196-14	IC BA7149F-E2
-------	--------------	---------------

## &lt; COIL &gt;

L901	1-412-031-11	INDUCTOR CHIP 47uH
L902	1-410-387-11	INDUCTOR CHIP 33uH
△L903	1-402-680-21	COIL, FERRITE (HCL)

## &lt; TRANSISTOR &gt;

Q902	8-729-106-68	TRANSISTOR 2SD1615-A-CP
Q903	8-729-216-31	TRANSISTOR 2SA1163G
Q904	8-729-120-28	TRANSISTOR 2SC1623-L5L6

## &lt; RESISTOR &gt;

R901	1-216-817-11	METAL CHIP	470	5%	1/16W
R902	1-216-817-11	METAL CHIP	470	5%	1/16W
R903	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R906	1-216-813-11	METAL CHIP	220	5%	1/16W
R907	1-216-845-11	METAL CHIP	100K	5%	1/16W
R908	1-216-852-11	METAL CHIP	390K	5%	1/16W
R909	1-216-833-11	METAL CHIP	10K	5%	1/16W
R910	1-216-835-11	METAL CHIP	15K	5%	1/16W
R911	1-216-160-00	METAL GLAZE	27	5%	1/8W
R912	1-216-857-11	METAL CHIP	1M	5%	1/16W

Ref. No.	Part No.	Description	Remarks
R913	1-216-820-11	METAL CHIP	820 5% 1/16W
R914	1-216-813-11	METAL CHIP	220 5% 1/16W
R915	1-216-793-11	METAL GLAZE	4.7 5% 1/16W
R916	1-218-881-11	METAL CHIP	27K 0.50% 1/16W
R917	1-218-893-11	METAL CHIP	82K 0.50% 1/16W

R918	1-216-829-11	METAL CHIP	4.7K 5% 1/16W
R919	1-216-839-11	METAL CHIP	33K 5% 1/16W
R920	1-216-837-11	METAL CHIP	22K 5% 1/16W
R921	1-216-795-11	METAL GLAZE	6.8 5% 1/16W
R922	1-216-847-11	METAL CHIP	150K 5% 1/16W

R923	1-216-857-11	METAL CHIP	1M 5% 1/16W
R924	1-216-862-11	METAL GLAZE	2.7M 5% 1/16W
R925	1-216-862-11	METAL GLAZE	2.7M 5% 1/16W
R926	1-216-821-11	METAL CHIP	1K 5% 1/16W
R927	1-216-821-11	METAL CHIP	1K 5% 1/16W

R928	1-216-827-11	METAL CHIP	3.3K 5% 1/16W
R929	1-216-818-11	METAL CHIP	560 5% 1/16W
R930	1-216-815-11	METAL CHIP	330 5% 1/16W
R931	1-216-810-11	METAL CHIP	120 5% 1/16W

## &lt; VARIABLE RESISTOR &gt;

RV904	1-238-862-11	RES, ADJ, CERMET 1M
-------	--------------	---------------------

## &lt; TRANSFORMER &gt;

△T901	1-453-124-11	TRANSFORMER ASSY, FLYBACK
-------	--------------	---------------------------

## &lt; THERMISTOR &gt;

TH901	1-809-350-21	THERMISTOR, NTC (2125)
-------	--------------	------------------------

## &lt; FLAT CABLE &gt;

W901	1-540-019-21	SOCKET ASSY, CRT
------	--------------	------------------

## MISCELLANEOUS

\*\*\*\*\*

61	1-542-259-11	MICROPHONE, CAP
66	1-775-517-11	CABLE, FLEXIBLE FLAT 8P
103	1-775-520-11	CABLE, FLEXIBLE FLAT 45P
120	1-775-519-11	CABLE, FLEXIBLE FLAT 4P
△159	1-452-673-11	CRT ASSY (M01KXX90WB)
203	1-775-518-11	CABLE, FLEXIBLE FLAT 12P
207	1-775-516-11	CABLE, FLEXIBLE FLAT 16P
209	1-547-739-21	LENS, ZOOM (VCL-5412WB) (TR510E)
209	1-547-833-11	LENS, ZOOM (VCL-6310WA) (TR330E)
211	1-547-558-21	FILTER BLOCK, OPTICAL (TR330E)
211	1-547-735-51	FILTER BLOCK, OPTICAL (TR510E)
218	1-775-833-11	CABLE, FLEXIBLE FLAT 18P (TR510E)
760	1-658-213-11	FP-355 FLEXIBLE BOARD
762	1-657-786-11	FP-221 FLEXIBLE BOARD
803	1-657-785-11	FP-248 FLEXIBLE BOARD

**Note:** The components identified by mark △ or dotted line with mark △ are critical for safety.  
Replace only with part number specified.



Ref. No.	Part No.	Description	Remarks
817	1-657-784-11	FP-220 FLEXIBLE BOARD	
D001	8-719-988-42	DIODE GL453	
M901	A-7048-806-A	DRUM BLOCK ASSY (DGH-OC2A-R)	
M902	8-835-531-01	MOTOR, DC SCE-0601A (CAPSTAN)	
M903	X-3945-401-1	MOTOR ASSY, DC (LOADING)	
S901	1-762-436-11	SWITCH, ROTARY (ENCODER)	
ACCESSORIES & PACKING MATERIALS			
*****			
⚠	A-7003-840-A	AC-V15 AC POWER ADAPTOR (TR330E:E, Australian, TR510E:AEP, UK)	
⚠	A-7003-842-A	AC-V15 AC POWER ADAPTOR (TR330E:UK)	
⚠	A-7003-843-A	AC-V15 AC POWER ADAPTOR (TR330E:Tourist)	
⚠	A-7003-969-A	AC-V15 AC POWER ADAPTOR (TR330E:Hong Kong)	
	A-7092-608-A	CASE (N) ASSY, BATTERY (TR510E)	
	1-473-342-11	REMOTE COMMANDER (RMT-713) (TR510E)	
⚠	1-569-008-11	ADAPTER, CONVERSION 2P (TR330E:E, Hong Kong, Tourist)	
	1-574-039-11	CORD, CONNECTION (AV CABLE) 1.5m	
⚠	1-764-622-11	ADAPTOR, CONVERSION (TR510E)	
	3-800-473-11	MANUAL, INSTRUCTION (ENGLISH/SPANISH) (TR510E:AEP/UK-2)	
	3-800-473-41	MANUAL, INSTRUCTION (GERMAN/ITALIAN) (TR510E:AEP/UK-1,3)	
	3-800-473-51	MANUAL, INSTRUCTION (FRENCH/DUTCH)	

Ref. No.	Part No.	Description	Remarks
			(TR510E:AEP/UK-3)
	3-800-473-61	MANUAL, INSTRUCTION (SWEDISH/PORTUGUESE) (TR510E:AEP/UK-2)	
	3-800-473-71	MANUAL, INSTRUCTION (ENGLISH/RUSSIAN) (TR510E:AEP/UK-1)	
	3-800-474-11	MANUAL, INSTRUCTION (ENGLISH/RUSSIAN) (TR330E:E, Hong Kong, Australian, Tourist)	
	3-800-474-41	MANUAL, INSTRUCTION (FRENCH/GERMAN) (TR330E:E, Hong Kong, Tourist)	
	3-800-474-51	MANUAL, INSTRUCTION (ARABIC/PORTUGUESE) (TR330E:E)	
	3-800-474-61	MANUAL, INSTRUCTION (CHINESE) (TR330E:E, Hong Kong, Tourist)	
	3-800-474-71	MANUAL, INSTRUCTION (ENGLISH/RUSSIAN) (TR330E:UK)	
	3-800-844-11	INSTRUCTION (UK)	
	3-947-969-21	BELT (S), SHOULDER	
*	3-966-371-21	INDIVIDUAL CARTON (TR510E)	
*	3-966-372-01	CUSHION, PULP	
*	3-966-748-11	INDIVIDUAL CARTON (TR330E:UK, E, Hong Kong)	
	3-966-748-12	INDIVIDUAL CARTON (TR330E:Tourist)	
*	3-966-748-21	INDIVIDUAL CARTON (TR330E:Australian)	

\*\*NP-33 BATTERY PACK

NOTE.

\*\*MARK PARTS IS AVAILABLE AS AN OPTIONAL ACCESSORY.

**Note:** The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.  
Replace only with part number specified.

## SECTION 6

### ADJUSTMENT

When performing adjustments, refer to the layout diagrams for adjustment related parts beginning from page 6-28.

#### 6-1. CAMERA SECTION ADJUSTMENT

##### 1-1. PREPARATIONS BEFORE ADJUSTMENT

###### 1-1-1. List of service tools

Oscilloscope	Regulated power supply	Vectorscope	Pattern generator
Adjustment screw driver	Color monitor	Digital voltmeter	

Ref.No.	Name	Parts Code	Usage
J-1	Filter for color temperature correction (C14)	J-6080-058-A	Auto white balance adjustment/check White balance adjustment/check
J-2	ND filter 1.0	J-6080-808-A	White balance check
	ND filter 0.3	J-6080-818-A	White balance check
J-3	Pattern box PTB-450	J-6082-200-A	
J-4	Color chart for pattern box	J-6020-250-A	
J-5	Siemens star	J-6080-875-A	For checking the flange back
J-6	Adjustment remote commander(RM-95 upgraded) Note	J-6082-053-B	
J-7	Multi CPC	J-6082-311-A	For video section adjustment (VC-167P board CN002)

**Note:** If the microprocessor IC in the adjusting remote commander is not the new microprocessor (UPD7503G-C56-12), the pages cannot be switched.  
In this case, replace with the new microprocessor (8-759-148-35).

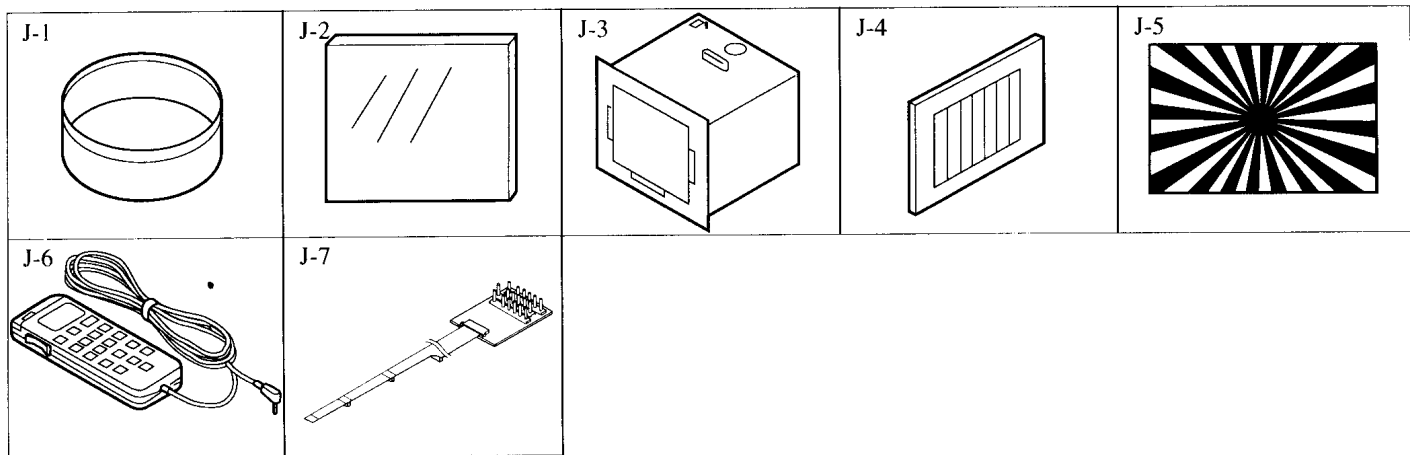


Fig.6-1-1.

## 1-1-2. Precautions

### 1. Switch settings

Adjust the switches to the following positions without loading the cassette tape unless otherwise specified.

#### 1.) Camera/video power switch

Operation switch block .....Camera

#### 2.) PROGRAM AE switch (CF-40 board S489).....AUTO

#### 3.) STEADY SHOT switch (CF-40 board S486)

(X24 MODEL).....OFF

#### 4.) D ZOOM switch (CF-40 board S300) (X24 MODEL) ....OFF

#### 5.) REC MODE switch (CF-40 board S483)

(X24 MODEL).....SP

### 2. Adjustment sequence

Adjust in the given order.

### 3. Subject

#### 1.) Set the camera and pattern box as shown in Fig. 6-1-2.

#### 2.) Color bar chart (Standard picture frame)

- Adjust the picture frame as shown in Fig. 6-1-3.
- Adjust camera zooming and direction until the camera output waveform on the oscilloscope shown in Fig. 6-1-3 (a) and the color picture on the monitor TV shown in Fig. 6-1-3 (b) have been acquired.
- Maintain this setup until adjustment is complete.

#### 3.) White pattern (Standard picture frame)

Remove the color bar chart from the pattern box and adjust the camera setup until the white pattern picture frame is the same size and same position as the color bar chart (the standard picture frame).

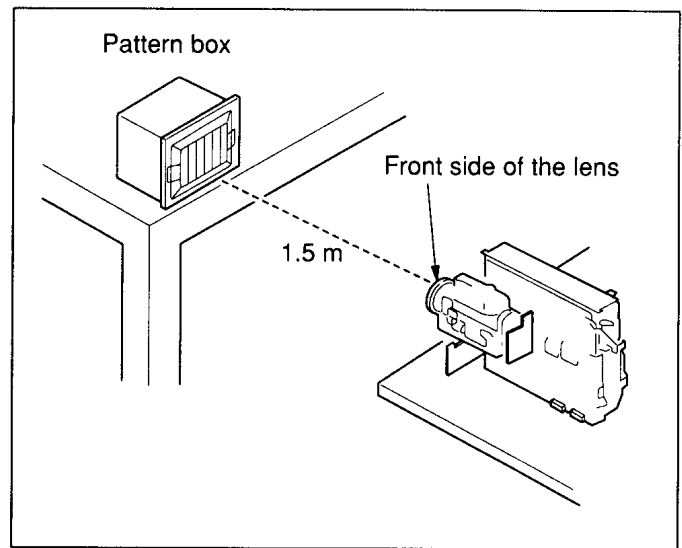


Fig. 6-1-2

Color bar chart standard picture frame

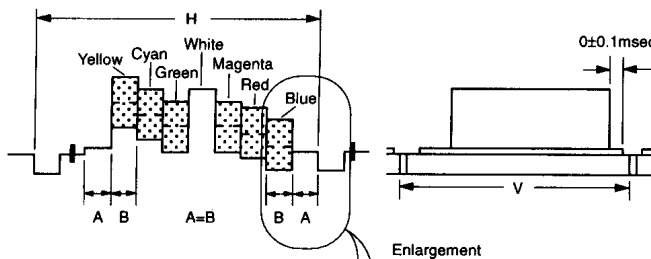


Fig. a (Video I/O terminal output waveform)

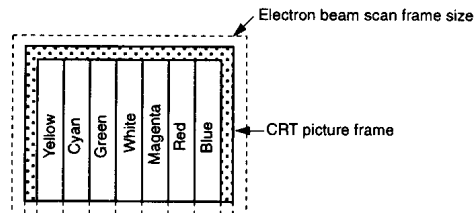
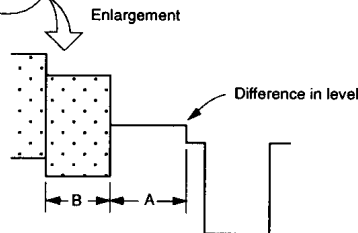


Fig. b (Picture on monitor TV)

Adjust camera zooming and direction to obtain the output waveform shown in Fig. "a" and the TV monitor display shown in Fig. "b".

Fig. 6-1-3

#### 4.) Chart for flange back adjustment

Join together a piece of white A0 size paper (1189 mm × 841 mm) and a piece of black paper to make the chart shown in Fig. 6-1-4.

Note: Use a non-reflecting and non-glazing vellum paper.  
The size must be A0 or larger and the joint between the white and black paper must not have any undulations.

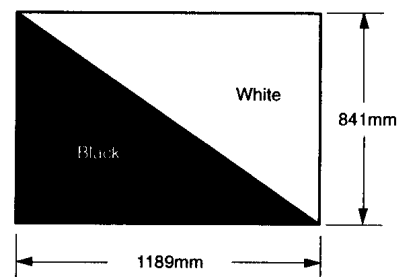
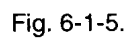


Fig. 6-1-4

**Note 1:** Refer to “2. Disassembly” for details of how to remove the cabinet and the respective boards.

1.) Connect the adjustment equipment as shown in Fig. 6-1-5.



**1-1-4. Adjustment remote commander (RM-95 upgraded)**

To perform adjustment, the adjustment data stored in the non-volatile memory must be rewritten using the adjustment remote commander (RM-95 upgraded).

The adjustment remote commander uses the remote commander signal line (LANC) to interactively communicate with the merchandise. The page, address and up/down command data are sent from the adjustment remote commander to the merchandise. In return, the page, address and data are sent to the adjustment remote commander from the merchandise.

**1. Using the adjustment remote commander**

- 1) Connect the adjustment remote commander to the LANC terminal (CF-40 board J480).
- 2) Set the NOR-ADJ (or HOLD) switch of the adjustment remote commander to the “ADJ” (or ON) (service) position.  
If the adjustment remote commander is correctly connected, the adjustment remote commander’s LED will show the display as shown in Fig. 6-1-6.
- 3) Bit value discrimination  
It is necessary to discriminate between the bit values with the data displayed on the adjustment remote commander for all following items. Identify whether the bit value is ‘1’ or ‘0’ with the use of the following diagram.

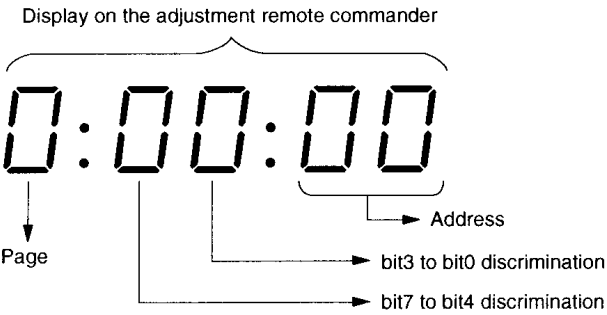


Fig 6-1-6

Display on the adjustment remote commander	Bit values			
	bit3 or bit7	bit2 or bit6	bit1 or bit5	bit0 or bit4
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
Ⓐ 8	1	0	0	0
9	1	0	0	1
A(℞)	1	0	1	0
B(b)	1	0	1	1
C(ℓ)	1	1	0	0
D(d)	1	1	0	1
Ⓑ E(ℰ)	1	1	1	0
F(F)	1	1	1	1

(example) If “8E” is displayed on the adjustment remote commander, the bit values for bit7 to bit4 are shown in the ‘Ⓐ’ column, and the bit values for bit3 to bit0 are shown in the ‘Ⓑ’ column.

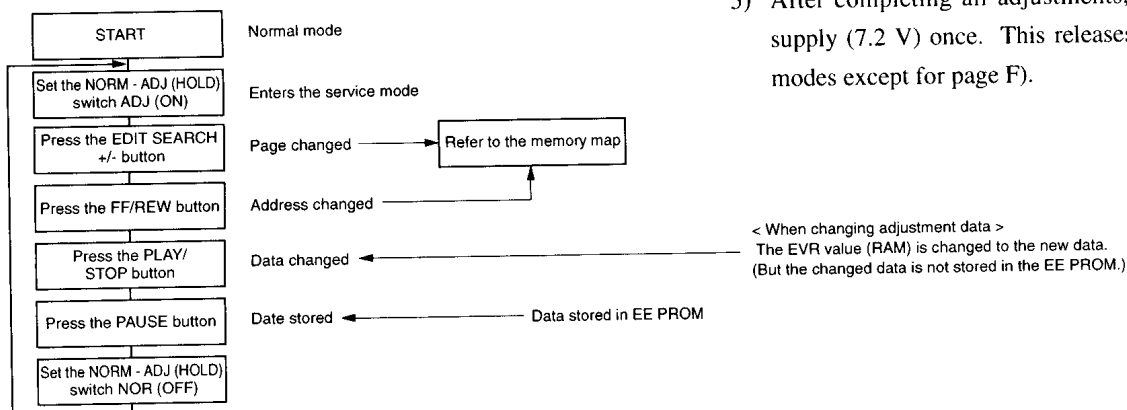
4) The adjustment remote controller is operated as follows:

- Changing the page

The pages increase when the EDIT SEARCH (+) button is pressed and decrease when the EDIT SEARCH (-) button is pressed. Altogether there are 16 pages from page "0" to page "F".

Hexadecimal notation	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
LCD display	0	1	2	3	4	5	6	7	8	9	A	b	C	d	E	F
Decimal notation after conversion	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

### [Sequence of Service Modes Using the Adjustment Remote Commander]



Command Name	Command Function	Normal LANC Command
Page Up	Page + 1	Edit Search +
Page Down	Page - 1	Edit Search -
Direct Page Set	Sets the specified page	Event Clear
Address Up	Address + 1	Fast Forward
Address Down	Address - 1	Rewind
Data Up	Data + 1	Play Back
Data Down	Data - 1	Stop
Store	Stores data in the EE PROM.	Pause

## 2. Precautions when using the adjustment remote commander

Mishandling of the adjustment remote commander may erase the correct adjustment data which has already been stored in the memory. To prevent this, it is recommended that all adjustment data is noted down on the attached page F address list before starting adjustments in addition to all new adjustment data after the completion of each adjustment step.

- Changing the address

The address increases when the FF (▶▶) button is pressed, and decreases when the REW (◀◀) button is pressed. Altogether there are 256 addresses from address "00" to address "FF". Some addresses, which are not used during adjustment, do not appear.

- Taking note the already-stored adjustment data

The previous adjustment can be erased if the adjustment remote commander is incorrectly handled. To prevent this, it is recommended that all the stored adjustment data be noted down on the attached page F address list.

- Changing the data (Data setting)

The data increases when the PLAY (▶) button is pressed, and decreases when the STOP (■) button is pressed. Altogether there 256 data from data "00" to data "FF".

- Storing the data

Press the PAUSE button to store the adjustment data (page F) into the non-volatile memory.

(If the PAUSE button is not pressed after completing the adjustment, the new adjustment data will not be stored in the non-volatile memory.)

5) After completing all adjustments, turn off the main power supply (7.2 V) once. This releases the adjustment mode (all modes except for page F).

## Page F Address List

**Note 1:** Data already stored in the adjustment data memo column are fixed values.

**Note 2:** The initial adjustment data values are the values which exist immediately after the execution of "F Page Data Initialization" and "F Page Data Modification". These differ from the values which exist after all adjustment have been performed.

**Note 3:** There are cases where data has been entered into F page addresses between 8C and EF, but these are not related to the adjustments.

Address	Adjustment Data	
	Initial Value	Memo Column
00	00	00
01	00	00
02	00	00
03	04	04
04	10	10
05	E0	E0
06	10	10
07	00	00
08	04	04
09	00	00
0A	FF	
0B	08	
0C	00	
0D	00	
0E	00	
0F	00	
10	00	
11	00	
12	80	
13	40	
14	40	
15	80	
16	80	
17	9E	
18	80	
19	68	
1A	7E	
1B	85	
1C	80	
1D	64	
1E	80	
1F	AD	
20	9E	
21	87	
22	C6	
23	C1	
24	58	
25	60	
26	80	

Address	Adjustment Data	
	Initial Value	Memo Column
27	80	
28	48	
29	40	
2A	80	
2B	80	
2C	40	
2D	00	
2E	2D	
2F	D3	
30	2D	
31	FD (FC)	
32	F3 (F4)	
33	00	
34	3C	
35	00	
36	3E	
37	E0	
38	8F	
39	6C	
3A	36	
3B	3C	
3C	A3	
3D	0D	
3E	8E	
3F	12	
40	47	
41	10	
42	80	
43	80	
44	64	64
45	46	46
46	00	00
47	55	55
48	80	80
49	7B	7B
4A	80	80
4B	78	78
4C	80	80
4D	92	92

( ) : ×24 MODEL

Address	Adjustment Data	
	Initial Value	Memo Column
4E	80	80
4F	91	91
50	80	80
51	80	80
52	80	80
53	A8	A8
54	CC	CC
55	3C	3C
56	1B	1B
57	80	80
58	80	80
59	80	80
5A	79	79
5B	4C	4C
5C	1A	1A
5D	36 (32)	36 (32)
5E	23	23
5F	45	45
60	16	16
61	A2 (A1)	A2 (A1)
62	A3	A3
63	BA	BA
64	2C (18)	2C (18)
65	09	09
66	66	66
67	07 (03)	07 (03)
68	66 (6B)	66 (6B)
69	9F	9F
6A	66	66
6B	66 (6C)	66 (6C)
6C	59 (5C)	59 (5C)
6D	83	83
6E	67	67
6F	5D	5D
70	5C	5C
71	4A	4A
72	1E (20)	1E (20)
73	5C	5C
74	3A (3C)	3A (3C)
75	33	33
76	02	02
77	1B	1B
78	E8	E8
79	28	28
7A	0D	0D
7B	6A	6A
7C	58	58
7D	44	44

( ): ×24 MODEL

Address	Adjustment Data	
	Initial Value	Memo Column
7E	33	33
7F	05	05
80	07	07
81	03	03
82	40	40
83	56	56
84	5D	5D
85	60	60
86	04	04
87	0F	0F
88	10	10
89	0A	0A
8A	38	38
8B	B0	B0
8C ~ E3		
E4 ~ EF		
F0 ~ FF		



## 1-2. CAMERA SYSTEM ADJUSTMENTS

### 1. Adjustment points when major parts have been replaced

When the CCD imager or lens block is replaced, adjust the items indicated by ○ in the following table.

	When the CCD imager is replaced	When the lens block is replaced
HALL adjustment		○
CCD imager compensation data writing	○	
Flange back adjustment	○	○
IRIS IN/OUT adjustment	○	○
MAX GAIN adjustment	○	
Color reproduction adjustment	○	
Auto white balance reference data input	○	
Auto white balance adjustment	○	

### 2. Power supply voltage check (VC-167P board)

Subject	Any subject
Measuring equipment	Digital voltmeter
DIG5V check	
Measurement Point	CN300 ④ Pin (CN300 ③⑧, ③⑨ Pin: MT GND)
Specification Value	$4.86 \pm 0.15\text{Vdc}$
DIG3.5V check	
Measurement Point	CN300 ③⑩ Pin (CN300 ③⑪, ③⑫ Pin: VTR GND)
Specification Value	$3.16 \pm 0.1\text{Vdc}$
CAM15V check	
Measurement Point	CN701 ①⑥ Pin (CN701 ① Pin: GND)
Specification Value	$14.95 \pm 0.4\text{Vdc}$
CAM-8.5V check	
Measurement Point	CN701 ①④ Pin (CN701 ① Pin: GND)
Specification Value	$-8.5 \pm 0.5\text{Vdc}$

### 3. Preparation for adjustment

Objective: Make sure that the camera can be operated from the LANC line even if the mode control microprocessor's A/D port is left open.

Mode	Any Mode
Measuring Equipment	Remote controller RM-95 upgraded for LANC
Adjustment Page	Page 6, page F
Adjustment Address	00, 02

### Check procedure

1) Check that all power supply voltages satisfy the specified value.

If not, refer to "Video circuit, Power supply block adjustment".

### Adjustment procedure:

Order	Page	Address	Data	Procedure
1				Turn the main power switch ON.
2	6	00	01	After setting the data, press the PAUSE button.
3	F	02	21	After setting the data, press the PAUSE button.
4				Turn off the UNREG power supply once, then turn it on.
5	6	00	00	After setting the data, press the PAUSE button.

Note 1: If data 01 is set to page 6, address 00, the adjustment for page F, address 01 to 8B can also be performed.

Note 2: When all adjustments of the camera system is completed, set data 00 to the page F, address 02.

#### 4. Initialization of page F data

**Note 1:** Execute the initialization of page F only when the non-volatile memory (VC-167P board IC401 EE PROM) is replaced.

**Note 2:** If the page F data has been initialized, all adjustment items of the camera section must be executed again.

##### Initializing procedure:

Order	Page	Address	Data	Procedure
1				Turn OFF and ON the main power supply. (Preparation)
2	6	00	01	After setting the data 01 to the address, press the PAUSE button.
3	6	11		Confirm that the data is 00.
4	6	01	2D	After setting the data, Press the PAUSE button. (Execution of page F data initialization. By this operation, all the data from address 01 to EF are initialized.)
5	6	11		Confirm that the data is 01.

##### Works required after initialization

Order	Page	Address	Data	Procedure
1	6	01	00	After setting the data, Press the PAUSE button.
2	6	00	00	After setting the data, Press the PAUSE button. (End)
				Perform the next item "5. Page F Data Modifications", then execute all adjustment items of the camera section.

##### Related Adjustments:

All items of camera adjustment excluding "28 MHz Crystal Oscillator Adjustment".

5. V SUB adjustment

Subject	Not required
Adjustment Page	F
Adjustment Address	26

Related Adjustments:  
“MAX gain adjustment”, “Auto white balance reference data input”, “Auto white balance adjustment”, “Color reproducibility adjustment”.

Adjustment method:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	26		Reading a voltage code of V SUB indicated by CCD imager then input data of a table (Fig.6-1-7)
3	F	26		Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

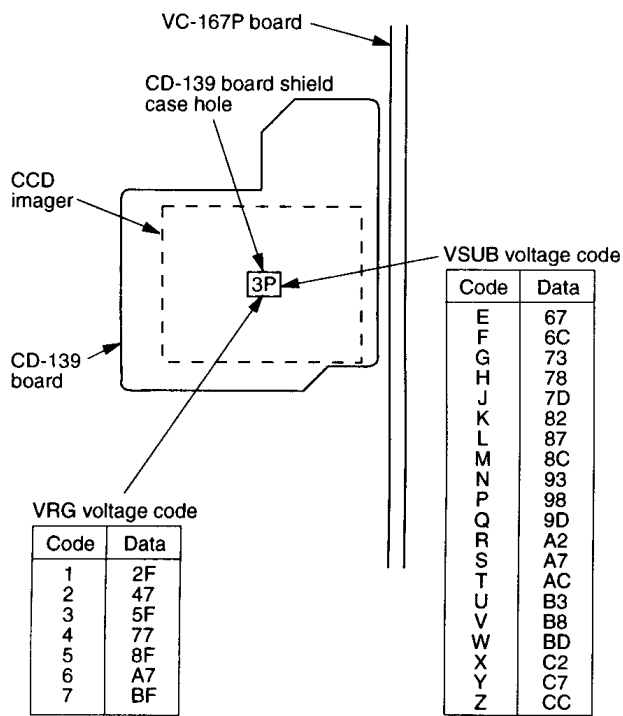


Fig 6-1-7

6. VRG adjustment

Subject	Not required
Adjustment Page	F
Adjustment Address	27

Adjustment method:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	27		Reading a voltage code of V SUB indicated by CCD imager then input data of a table (Fig.6-1-7)
3	F	27		Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

## 7. Page F data modification

All the data of page F are automatically initialized if the initialization is executed. However, among the initialized data, the following addresses require manual modification of data after the page F data is initialized.

### Modification procedure:

Order	Page	Address	Data		Procedure
			X10 model	X24 model	
1	6	00	01		After setting the data, Press the PAUSE button. (Preparation)
2	F	04	90	60	Set each data to each address, and press the PAUSE button.
		07	-	07	
		08	14	14	
		31	-	FC	
		32	-	F4	
		54	AA	AA	
		5D	-	32	
		5E	24	-	
		60	-	15	
		61	A4	B8	
		63	85	82	
		64	-	20	
		65	-	00	
		67	-	03	
		68	-	6B	
		6B	-	6C	
		6C	-	5C	
		72	-	20	
		74	-	3C	
		78	-	D8	
		7C	5C	-	
		7D	62	-	
		8B	D0	D0	
		E4-EF	00	00	
		F5	A8	A8	
		F6	5E	5E	
		F7	C4	94	

## 8. 28 MHz crystal oscillator adjustment

**Purpose:** Adjusts 28 MHz crystal controlled oscillation for synchronizing clock.

**Adjustment error:** Loss of synchronization or loss of color

Subject	Note required
Measurement Point	IC201 ⑤ pin
Measuring Instrument	Frequency counter
Adjustment Page	F
Adjustment Address	25
Specification	4433618.75 ± 17Hz

### Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	25		Change the data using PLAY, STOP buttons until the frequency satisfies the specification.
3	6	00	00	After setting the data, press the PAUSE button. (End)

### Reference: Conversion between the hexadecimal number and decimal number.

In some adjustment items, data appears in hexadecimal numbers on the DDS display or on the adjustment remote commander. Maintenance engineers are expected to convert the displayed hexadecimal numbers to the corresponding decimal numbers using the following conversion table.

Make a required calculation described in each adjustment item. Then re-convert the result of calculation back from the decimal numbers to the corresponding hexadecimal numbers using the following conversion table.

**Hexadecimal-Decimal Conversion Table**

Lower digit of hexadecimal Upper digit of hexadecimal	0	1	2	3	4	5	6	7	8	9	A (H)	B (h)	C (L)	D (d)	E (E)	F (F)
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
5	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A(H)	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
① → B(h)	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
C(L)	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D(d)	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E(E)	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F(F)	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

**Note:** The characters shown in the parenthesis ( ) shows the display on the adjustment remote commander.

(Example) If the DDS display or the adjustment remote commander shows BD (bd);

Because the upper digit of the hexadecimal number is B (b), and the lower digit is D (d), the meeting point "189" of (1) and (2) in the above table is the corresponding decimal number.

The decimal numbers are divided into following three categories. Calculation method is different in three categories respectively.

- |               |   |             |
|---------------|---|-------------|
| (1)0~255      | → | 00h~FFh     |
| (2)256~4095   | → | 0100h~0FFFh |
| (3)4096~65536 | → | 1000h~FFFFh |

- 1) Divide the decimal number by 16. Result is "A".
- 2) Take the integer portion of the number "A" as "B".
- 3) Calculate the equation  $(A-B) \times 16$ . Result is "C".
- 4) "B" is the second digit number of the hexadecimal number and "C" is the first digit number of the hexadecimal number.

(BC)<sub>h</sub>

- 1)  $189 \div 16 = \underline{11}.8125 \dots\dots\dots (A)$   
 $\quad \quad \quad \uparrow$
- 2)  $\quad \quad \quad (B)$
- 3)  $(11.8125 - 11) \times 16 = 13 \dots\dots\dots (C)$
- 4)  $189 \rightarrow (BD)_{16}$  is obtained.

- 1) Divide the decimal number by 256. Result is "A".
- 2) Take the integer portion of the number "A" as "B".
- 3) Calculate the equation  $(A-B) \times 256$ . Result is "C".
- 4) Take the integer portion of the number "C" as "D".
- 5) Calculate the equation  $(C-D) \times 16$ . Result is "E".
- 6) "B" is the third digit number, "D" is the second digit number and "E" is the first digit number of the hexadecimal number.

(BDE)h

- 1)  $2100 \div 256 = \underline{8.203125}$  (A)
- ↑
- 2) (B)
- 3)  $(8.203125 - 8) \times 256 \div 16 = \underline{3.25}$ .....(C)
- ↑
- 4) (D)
- 5)  $(3.25 - 3) \times 16 = 4$ .....(E)
- 6)  $2100 \rightarrow (834)_h$  is obtained.

- 1) Divide the decimal number by 4096. Result is "A".
- 2) Take the integer portion of the number "A" as "B".
- 3) Calculate the equation  $(A - B) \times 4096 \div 256$ . Result is "C".
- 4) Take the integer portion of the number "C" as "D".
- 5) Calculate the equation  $(C - D) \times 256 \div 16$ . Result is "E".

- 6) Take the integer portion of the number "E" as "F".
- 7) Calculate the equation  $(E-F) \times 16$ . Result is "G". (Round the number "G" to count fractions of 0.5 and over as a unit and cut away the rest.)
- 8) "B" is the fourth digit number, "D" third digit number, "F" is the second digit number and "G" is the first digit number of the hexadecimal number. (BDFG)h

- 1)  $31814 \div 4096 = 7.7670898 \dots\dots\dots$ (A)  
 $\uparrow$
- 2) (B)
- 3)  $(7.7670898 - 7) \times 4096 \div 256 = 12.273436 \dots\dots\dots$ (C)  
 $\uparrow$
- 4) (D)
- 5)  $(12.273436 - 12) \times 256 \div 16 = 4.374976 \dots\dots\dots$ (E)  
 $\uparrow$
- 6) (F)
- 7)  $(4.374976 - 4) \times 16 = 5.999616$   
(Round the number to count fractions of 0.5 and over as  
unit and cut away the rest.)  
 $\downarrow$
- 8) 6.....(G)
- 9)  $31814 \rightarrow (7C46)_h$  is obtained.

(Example) If the hexadecimal number is “(3BA4)h”:  
 $(3 \times 4096) + (11 \times 256) + (10 \times 16) + (4 \times 1) = 15268$

## 9. HALL adjustment

**Purpose:** Variation of the HALL element outputs is removed by adjusting amplifier gain and offset. The HALL elements detect the lens iris position.

**Adjustment error:** Oscillation of lens iris, or incorrect white balance indoor and outdoor.

Subject	Not required
Measurement Point	DDS display on the EVF or monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	2A 2B
Specification	13 to 17h when iris is opened. 77 to 7Bh when iris is closed.

### Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	02	21	After setting the data, press the PAUSE button.
3				Turn off the UNREG power supply once, then turn it on.
4	6	00	01	After setting the data, press the PAUSE button.
5	6	02	03	After setting the data, press the PAUSE button.
6	6	01	03	After setting the data, press the PAUSE button.
7	F	2A	40	After setting the data, press the PAUSE button. Read the data appearing on the DDS display note. The read-out data is W <sub>2</sub> .
8	F	2A	30	After setting the data, press the PAUSE button. Read the data appearing on the DDS display note. The read-out data is W <sub>1</sub> .
9	6	01	01	After setting the data, press the PAUSE button.
10	F	2A	30	After setting the data, press the PAUSE button. Read the data appearing on the DDS display note. The read-out data is K <sub>1</sub> .
11	F	2A	40	After setting the data, press the PAUSE button. Read the data appearing on the DDS display note. The read-out data is K <sub>2</sub> .
12				Convert the data W <sub>1</sub> , W <sub>2</sub> , K <sub>1</sub> and K <sub>2</sub> into the decimal numbers. The result decimal numbers are W <sub>1</sub> ', W <sub>2</sub> ', K <sub>1</sub> ' and K <sub>2</sub> '. (Use the <How to convert the hexadecimal number to decimal number> or "Hexadecimal-Decimal Conversion Table". Calculate the following equation (decimal number calculation) to obtain X <sub>1</sub> '.
13				$A' = W_2' + K_1' - W_1' - K_2' \dots\dots\dots \text{equation 1}$ $B' = W_1' - K_1' \dots\dots\dots \text{equation 2}$ $X_1' = \frac{1600 + (48 \times A') - (16 \times B')}{A'} \dots\dots\dots \text{equation 3}$
14				Convert the decimal number X <sub>1</sub> ' to the hexadecimal number to obtain X <sub>1</sub> . (Round the number X <sub>1</sub> to count fractions of 0.5 and over as a unit and cut away the rest.)
15	F	2A		Set the data X <sub>1</sub> (obtained at step 14).
16				Press the PAUSE button.
17	F	2B		Change the data using the PLAY and STOP until 15 appears on the DDS display.
18				Press the PAUSE button.
19	6	01	03	After setting the data, press the PAUSE button.
20				If the DDS display shows the data in the range from 77 to 7B, it indicates the end of adjustment, and proceed to the item "Processing after Adjustments". If it is not, use the DDS display data as W <sub>0</sub> and proceed to step 21 and followings.

**Note:** Lower two digits of the data which is displayed at the right bottom of the EVF or TV monitor

Order	Page	Address	Data	Procedure
21				Convert the value $W_0$ to a decimal value to obtain the value $W_0'$ .
22				Calculate the value $X_2'$ from the following equation (decimal calculation). $C' = W_0' + K_1' - W_1' - 20$ .....equation 4 $X_2' = \frac{(100 - B') \times (X_1' - 48) + (48 \times C')}{C'}$ .....equation 5 (The values $X_1'$ and $B'$ are obtained from the equations 2 and 3 in step 13.)
23				Convert the value $X_2'$ to a hexadecimal number to obtain $X_2$ . (Round the number $X_2$ to count fractions of 0.5 and over as a unit and cut away the rest.)
24	F	2A		Set the data $X_2$ (which is the result of calculation in step 23).
25	F	2A		Press the PAUSE button.
26	F	2B		Change data using PLAY and STOP button until 79 appears on the DDS display.
27	F	2B		Press the PAUSE button.
28	6	01	01	After setting the data, press the PAUSE button.
29				Confirm that the DDS display shows the data in the range from 13 to 17.

#### Processing after Adjustments:

Order	Page	Address	Data	Procedure
1	6	02	00	After setting the data, press the PAUSE button.
2	6	01	00	After setting the data, press the PAUSE button.
3	F	02	00	After setting the data, press the PAUSE button.
4				Turn off the UNREG power supply once, then turn it on.
5	6	00	00	After setting the data, press the PAUSE button. (End)

#### Related adjustments:

“IRIS IN/OUT adjustment”

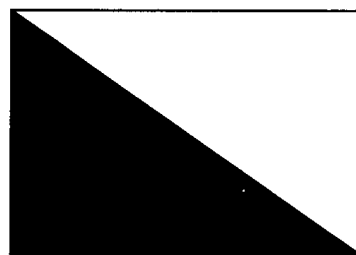


## 10. Flange back adjustment

**Purpose:** Automatic flange back adjustment of inner focus lens.

**Adjustment error:** Loss of focus when switched between auto focus and manual focus.

Subject	Chart for flange back adjustment (Placed 2000 ±5 mm in front of the lens with illumination of 300 ±50 lux.)
Measurement Point	Confirm the focus on monitor TV.
Measuring Instrument	Confirm focus on monitor TV
Adjustment Page	F
Adjustment Address	3C 3D 3E 3F 40 41



(Chart for flange back adjustment)  
(See Page 6-2)

**Note:** Confirm that the "Camera-shaking correction" and "Digital Zoom" are turned OFF. (X24 MODEL)

### Adjustment procedure:

Order	Page	Address	Data	Procedure
1				Check that the center of the flange back adjustment chart coincides with that of the display on the monitor at both ends: TELE end and the WIDE end of the zoom lens.
2	6	00	01	After setting the data, press the PAUSE button. (Preparation)
3				Confirm that the data at page F, address 1B is the initial value, referring to the "Page F address list".
4	6	11		Confirm that the data is 00.
5	6	42	02	After setting the data, press the PAUSE button.
6	6	43	01	After setting the data, press the PAUSE button.
7	6	01	13	After setting the data, press the PAUSE button.
8	6	01	15	After setting the data, press the PAUSE button. The adjustment data is automatically input to page: F, addresses: 3C to 41.
9	6	11		Confirm that the data is 01.
10	6	42	00	After setting the data, press the PAUSE button.
11	6	43	00	After setting the data, press the PAUSE button.

### Processing after Adjustments:

Order	Procedure
1	Turn the main power supply (7.2 V) OFF, then ON. (If this step is not performed, the camera will be out of focus.)

## 11. Flange back check


Subject	Siemens star (Placed 2000 ±5 mm in front of the lens with illumination of about 200 lux.)
Measurement Point	Confirm focus on monitor TV
Measuring Instrument	
Specification Value	Picture must have good focus at both TELE and WIDE ends.

**Note 1:** Confirm that the "Camera-shaking correction" and "Digital Zoom" are turned OFF. (X24 MODEL)

**Note 2:** It is judged from the page A display on the adjustment remote commander if the picture has good focus while the auto focus is ON.

- 1) Set data: 0B to the page:6, address: 02.
- 2) Focus condition can be known from the page A display.

A: 00 : XX


 odd number: Picture is in focus.  
 even number: Picture is out of focus.

### Adjustment procedure:

Order	Page	Address	Data	Procedure
1				Place a Siemens star at 2 meters in front of lens.
2				Decrease illumination to the chart down to a point before noise appears on monitor TV, in order to fully open the IRIS.
3	6	42	02	After setting the data, press the PAUSE button.
4	6	43	01	After setting the data, press the PAUSE button.
5				Shoot the Siemens star at TELE end.
6				Confirm that the image is in focus. (Note2).
7	6	21	10	After setting the data, press the PAUSE button.
8				Shoot the Siemens star at WIDE end.
9				Confirm that the image is in focus.

### Processing after Adjustments:

Order	Page	Address	Data	Procedure
1	6	02	00	After setting the data, press the PAUSE button.
2	6	21	00	After setting the data, press the PAUSE button. (END)
3	6	42	00	After setting the data, press the PAUSE button.
4	6	43	00	After setting the data, press the PAUSE button.

12. Picture frame setting

Subject	Color bar chart standard picture frame
Measurement Point	VIDEO output terminal (Terminated in 75 Ω )
Measuring Instrument	Oscilloscope and monitor TV
Specification Value	A=B, C=D, t=0 ± 0.1msec

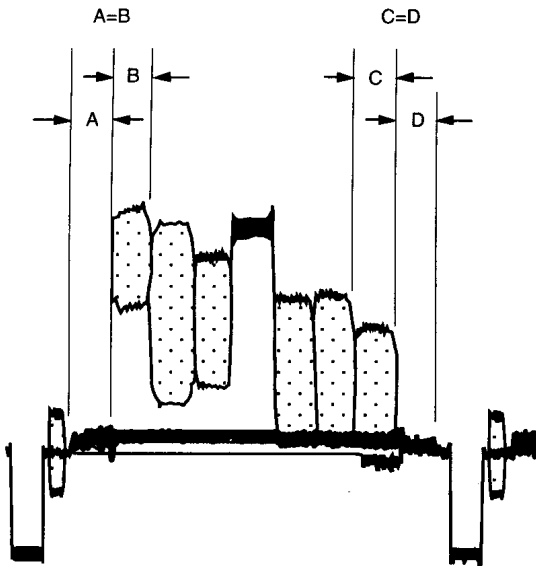
Note : Confirm that the "Camera-shaking correction "and "Digital Zoom" are turned OFF. (X24 MODEL)

Setting procedure:

Order	Procedure
1	Turn OFF the auto focus.
2	Adjust the focus using the focus knob.
3	Adjust direction and zoom of camera so that the picture frame is adjusted as specified by Fig. 6-1-8 and Fig. 6-1-9.
4	Write down markings on the picture frame on the monitor screen. If the "color bar chart standard picture frame" or "white pattern standard picture frame" is specified in the following adjustment items, obtain this picture frame.

Confirm with an oscilloscope

1. Horizontal rate



2. Vertical rate

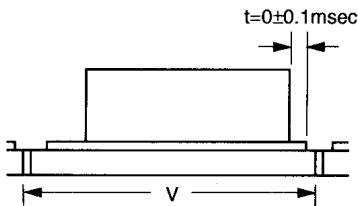


Fig. 6-1-8

Confirm on TV monitor (underscanned display)

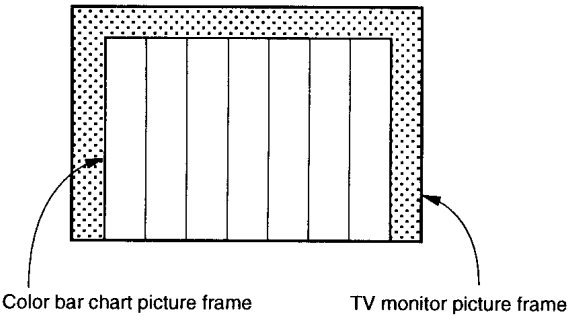


Fig. 6-1-9

13. Color reproduction adjustment

Purpose: Adjust the three primary color matrix coefficients for correct color reproduction.

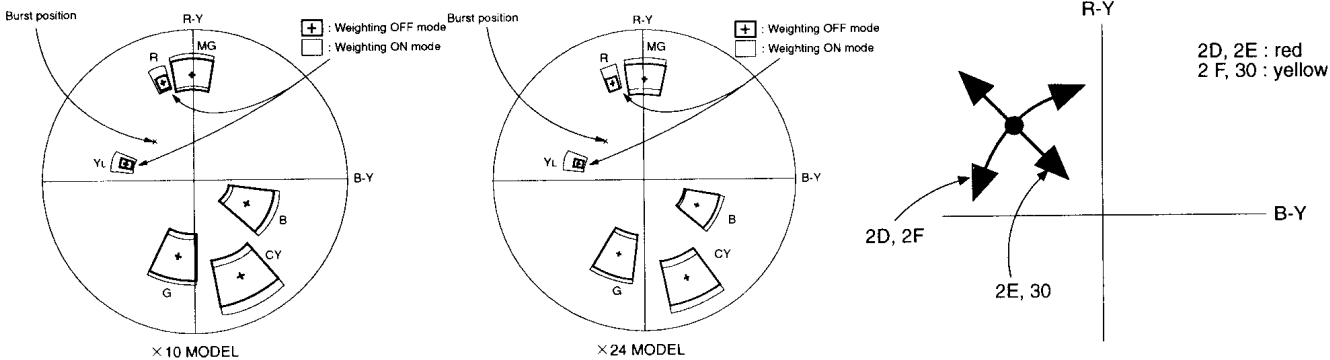
Adjustment error: Poor color reproduction.

Subject	Color bar chart standard picture frame
Measurement Point	VIDEO output terminal (Terminated in 75 Ω )
Measuring Instrument	Vectorscope
Adjustment Page	F
Adjustment Address	2D, 2E, 2F, 30
Specification Value	Each spot must be located within the specified color reproduction zone on a vectorscope display.

Note : Confirm that the "Camera-shaking correction "and "Digital Zoom" are turned OFF. (X24 MODEL)

Adjustment procedure:

Order	Page	Address	Data	Procedure	Condition
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)	
2	6	42	02	After setting the data, press the PAUSE button.	
3	6	03	00	After setting the data, press the PAUSE button. (Setting)	
4	6	01	37	After setting the data, press the PAUSE button.	
5	F	2D, 2E 2F, 30		Change the data so that each spot must be located within the specified color reproduction zone on a vectorscope display.  Press the PAUSE button for each address.	Weighting OFF mode.



Processing after Adjustments:

Order	Page	Address	Data	Procedure
1	6	01	00	After setting the data, press the PAUSE button.
2	6	03	10	After setting the data, press the PAUSE button. (Setting)
3	6	42	00	After setting the data, press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

Related Adjustments:

- “Auto white balance reference data input”
- “Auto white balance adjustment”

#### 14. IRIS IN/OUT adjustment

**Purpose:** Measure the light level and write into EE PROM for indoor/outdoor identification in auto white balance.

**Adjustment error:** Incorrect white balance.

Subject	White pattern standard picture frame
Measurement Point	EVF or DDS display of monitor TV
Measuring Instrument	
Adjustment Page	F
Adjustment Address	3A 3B

**Note :** Confirm that the "Camera-shaking correction "and "Digital Zoom" are turned OFF. (X24 MODEL)

#### Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	02	21	After setting the data, press the PAUSE button.
3				Turn off tje UNREG power supply once, then turn it on.
4	6	00	01	After setting the data, press the PAUSE button.
5	6	11		Confirm that the date is 00,,
6	6	01	4B	After setting the data, press the PAUSE button.
7	6	01	49	After setting the data, press the PAUSE button.
8	6	11		If data is 01, this is the end of data read.

#### Processing after Adjustments:

Order	Page	Address	Data	Procedure
1	6	01	00	After setting the data, press the PAUSE button.
2	F	02	00	After setting the data, press the PAUSE button.
3				Turn off tje UNREG power supply once, then turn it on.
4	6	00	00	After setting the data, press the PAUSE button. (End)

The page: A data appears on DDS of monitor TV.

## 15. MAX gain adjustment

**Purpose:** Sets the minimum illumination level.

**Adjustment error:** Normal video level cannot be obtained at low illumination (dark).

Subject	White pattern standard picture frame
Measurement Point	VIDEO output terminal (Terminated in $75\Omega$ )
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	2C
Specification Value	A = $615 \pm 10$ mV (X10 MODEL) A = $390 \pm 10$ mV (X24 MODEL)

**Note :** Confirm that the "Camera-shaking correction "and  
"Digital Zoom" are turned OFF. (X24 MODEL)

### Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	6	01	19	After setting the data, press the PAUSE button.
3	F	2C		Change data using PLAY and STOP buttons so that the Y signal level (A) satisfies the specification. The data which satisfies the Y signal level (A) is called "D2c".
4	F	2C		Set the data "D2c" and press the PAUSE button (X24 model).
5	F	2C		Calculate to subtract 28h from "D2c" (data = "D2c" - 28h). Set result of the calculation and press the PAUSE button. (X10 MODEL).

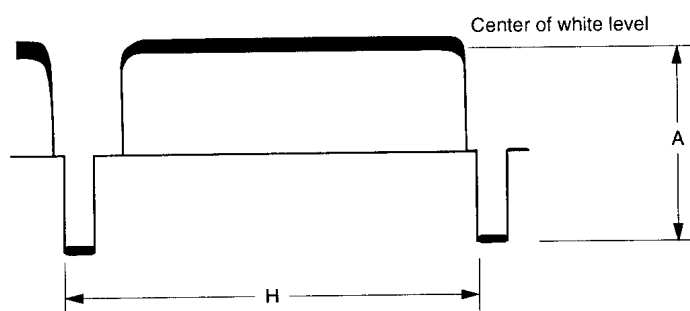


Fig. 6-1-10.

### Processing after Adjustments:

Order	Page	Address	Data	Procedure
1	6	01	00	After setting the data, press the PAUSE button.
2	6	00	00	After setting the data, press the PAUSE button. (End)

## 16. Auto white balance reference data input

Subject	White pattern standard picture frame
Adjustment Page	F
Adjustment Address	33, 34, 35, 36

**Note 1:** Confirm that the "Camera-shaking correction" and "Digital Zoom" are turned OFF. (X24 MODEL)

**Note 2:** The "Color reproduction adjustment" must have been completed before making this adjustment.

### Adjustment procedure:

Order	Page	Address	Data	Procedure
1				Turn the main power OFF then to ON.
2				Shoot a white pattern with the standard picture frame.
3	6	00	01	After setting the data, press the PAUSE button.
4	6	11		Confirm that data is 00.
5	6	01	11	After setting the data, press the PAUSE button.
6	6	01	0D	After setting the data, press the PAUSE button. (Executes the auto white balance reference data input.)
7	6	11		If data is 01, this is the end of data read.

### Processing after Adjustments:

Order	Page	Address	Data	Procedure
1	6	01	00	After setting the data, press the PAUSE button.
2				Execute "Auto white balance adjustment".
3	6	00	00	After setting the data, press the PAUSE button. (End)

### Related Adjustments:

Auto white balance adjustment

## 17. Auto white balance adjustment

Purpose: Adjust for correct auto white balance.

Adjustment error: Poor color reproduction.

Subject	White pattern standard picture frame
Filter	Color temperature correction filter C14
Measurement Point Measuring Instrument	EVF or DDS display on monitor TV
Adjustment Page	F
Adjustment Address	38 39
Specification Value	R ratio $2A80 \pm 40h$ B ratio $5E80 \pm 80h$

Note 1: Make this adjustment after "Auto white balance reference data input" is completed.

Note 2: Confirm that the "Camera-shaking correction" and "Digital Zoom" are turned OFF. (X24 MODEL)

### Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation 1)
2	F	02	21	After setting the data, press the PAUSE button. (Preparation 2)
3				Turn off the UNREG power supply once, then turn it on.
4	6	00	01	After setting the data, press the PAUSE button.
5	6	01	35	After setting the data, press the PAUSE button.
6	6	02	04	After setting the data, press the PAUSE button. Sets the R ratio display mode.
7	F	38		Change data using the PLAY and STOP buttons until the <u>R ratio data</u> on the DDS display becomes the specification value. R ratio data = $2000h + 10h \times D_{F5}$ ( $D_{F5}$ = Page F, Address: F5 data)
8	6	02	05	After setting the data, press the PAUSE button. Sets the B ratio display mode.
9	F	39		Change data using the PLAY and STOP buttons until the <u>B ratio data</u> on the DDS display becomes the specification value. B ratio data = $80h + 100h \times D_{F6}$ ( $D_{F6}$ = Page F, Address: F6 data)
10				Press the PAUSE button.

### Processing after Adjustments:

Order	Page	Address	Data	Procedure
1	6	01	00	After setting the data, press the PAUSE button.
2	6	02	00	Releases the B ratio display mode.
3	F	02	00	After setting the data, press the PAUSE button. (End 2)
4				Turn off the UNREG power supply once, then turn it on.
5	6	00	00	After setting the data, press the PAUSE button. (End 1)



## 18. White balance check

Subject	White pattern standard picture frame
Filter	Color temperature correction filter C14 ND filter 1.0 and 0.3
Measurement Point	VIDEO output terminal (Terminated in $75\Omega$ )
Measuring Instrument	Vectorscope
Specification Value	Fig. 6-1-11. A ~ C

Note : Confirm that the "Camera-shaking correction "and  
"Digital Zoom" are turned OFF. (X24 MODEL)

### Check procedure:

Order	Page	Address	Data	Procedure	Condition
1				Check that the lens is not covered by either filter.	
2	6	01	0F	After setting the data, press the PAUSE button.	
3				Check that the white luminance point is located within the circle shown in Fig. A.	Without filter.
4	6	01	00	After setting the data, press the PAUSE button.	
5	6	01	23	After setting the data, press the PAUSE button.	
6				Put the C14 filter on the lens.	
7				Check that the white luminance point is located within the circle shown in Fig. B.	C14 filter.
8				Remove the C14 filter and put ND filter 1.3 (1.0 + 0.3) on the lens.	
9				Check that the white luminance point is located within the circle shown in Fig. C.	ND Filter 1.3

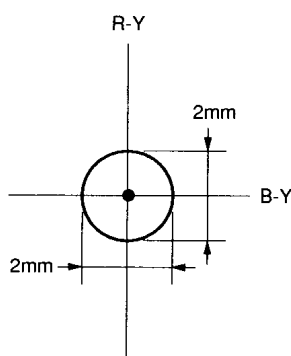


Fig. 6-1-11. A

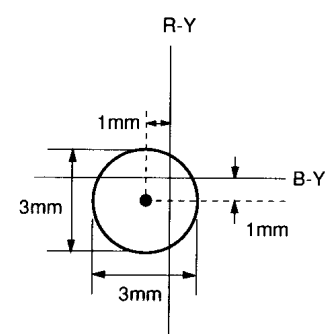


Fig. 6-1-11. B

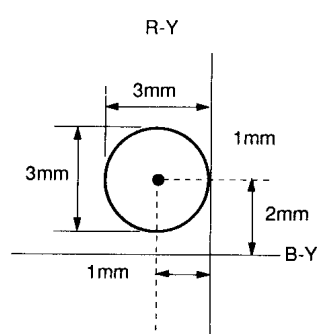


Fig. 6-1-11. C

### Processing after Adjustments:

Order	Page	Address	Data	Procedure
1	6	01	00	After setting the data, press the PAUSE button.
2	6	00	00	After setting the data, press the PAUSE button. (End)

## [X24 MODEL]

### 19. Camera-shaking correction adjustment

The "Camera-shaking correction adjustment" is necessary only when the angular speed sensor is replaced. If microprocessors or circuit is replaced or repaired, this adjustment is not necessary. Make operation check only.

Subject	
Measurement Point	VIDEO output terminal (Terminated in 75 $\Omega$ )
Measuring Instrument	Oscilloscope or TV monitor
Adjustment Page	F
Adjustment Address	42 43
Specification Value	Horizontal residual vibration $\leq 0.5\mu\text{sec}$ Vertical residual vibration $\leq 0.2\text{msec}$

**Note 1:** Caution when replacing parts

The two types of parts: ENC05EA and ENC05EB are supplied. Use the same type of sensor as that of the defective sensor. If different type of either ENC05EA or ENC05EB is used, picture can vibrate vertically or horizontally during camera-shake correction. After replacement, make adjustment as described.

**Note 2:** Caution on angular speed sensor

The angular speed sensor has high precision vibrator inside. If the sensor is dropped, balance of the vibrator is lost resulting in faulty operation. Handle the sensor carefully.

#### Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	6	42	07	After setting the data, press the PAUSE button.
3	6	01	3F	After setting the data, press the PAUSE button.
4				Obtain the vertical data from the following equation using the value indicated on SE650 of the TZ-3 board as the sensor sensitivity value. (Result of calculation must be converted to hexadecimal value.)  [Vertical data] Hex = $\frac{148d}{\text{sensor sensitivity value}} \times [\text{Hex}]$
5	F	42		Set the [Vertical data] Hex value to the page F, address 42 and press the PAUSE button.
6				Obtain the horizontal data from the following equation using the value indicated on SE651 of the TZ-3 board as the sensor sensitivity value. (Result of calculation must be converted to hexadecimal value.)  [Horizontal data] Hex = $\frac{121d}{\text{sensor sensitivity value}} \times [\text{Hex}]$
7	F	43		Set the [Horizontal data] Hex value to the page F, address 43 and press the PAUSE button.
8				Confirm that "Camera-shaking correction adjustment" works correctly.
9	6	00	00	After setting the data, press the PAUSE button. (End)
10	6	42	00	After setting the data, press the PAUSE button.
11	6	01	00	After setting the data, press the PAUSE button.

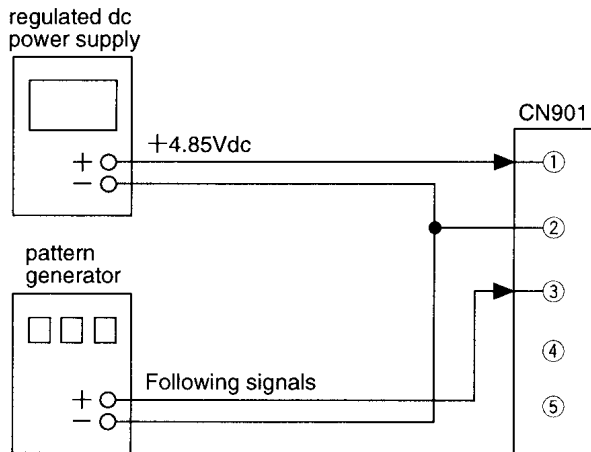
**Note :** Phase of the residual vibration must be in the same phase as that while no correction is applied.

## 20. Electronic viewfinder system adjustments (VF-87P board)

**Note :** About 2200V dc is applied to CRT anode and about 200 Vdc to the grid. Be careful not to touch them. If hand touches them, there is danger of electric shock

### Preparation :

1. Disconnect a flexible board from CN901 on VF-87P board.
2. Connect equipments as follows.



### Required signals

#### 1. Monoscope signal

Output amplitude: 1.0 V p-p (75Ω terminated)  
Horizontal resolution: 600 TV lines or more  
Vertical resolution: 350 TV lines or more

#### 2. Dot pattern signal

Output amplitude 1.0 V p-p (75Ω terminated)

#### 3. Contrast signal

Output amplitude 0.5 V p-p (75Ω terminated)  
fH: 15.625kHz  
fV: 50Hz

Others: Complies with PAL. (Refer to Fig. 6-1-12.)

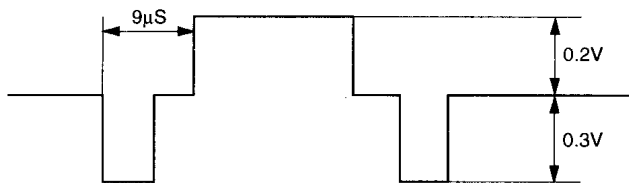


Fig. 6-1-12

### 20-1. Power supply voltage check

Measuring Instrument	Digital voltmeter
EVF5V	
Measurement Point	CN901 Pin-1
Specification Value	$4.85 \pm 0.01$ Vdc

### 20-2. Horizontal and vertical position

**Purpose:** Maintains horizontal position.

**Adjustment error:** Horizontal position cannot be maintained.

Signal	Monoscope signal
Adjustment	
Specification Value	Overscan $7 \pm 3\%$ (horizontal) (one side) Overscan $7 \pm 5\%$ (vertical) (one side)

### Adjustment procedure:

Order	Procedure
1	Confirm that the horizontal and vertical picture sizes satisfy the specification values.

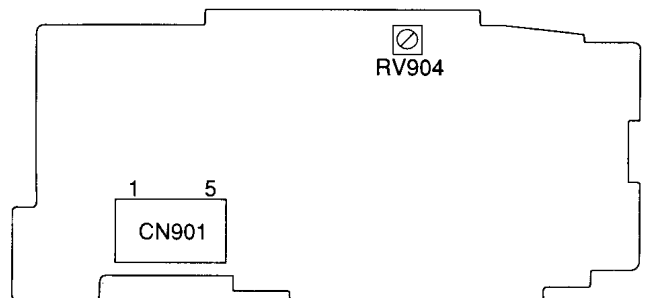
### 20-3. BRIGHT adjustment

Signal	Contrast signal
Adjustment	RV904
Specification Value	$19 \pm 4$ cd/m <sup>2</sup>

### Adjustment procedure:

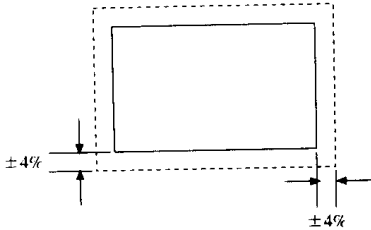
Order	Procedure
1	Brightness of the dark portion of the contrast signal satisfies the specification value.
2	Check by inputting the character generator signal that too much halation does not exist.

### VF-87P BOARD (SIDE A)



20-4. Centering adjustment

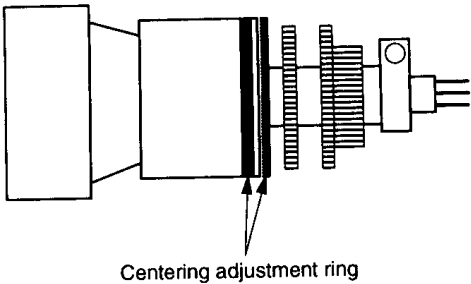
Signal	Monoscope signal
Adjustment	DY centering
Specification Value	$\pm 4\%$



Adjustment procedure:

Order	Data Procedure
1	Adjust DY centering adjustment ring so that margins at top, bottom, right and left are equal.

**Note:** The centering position is affected by earth magnetism. Rotate the camera 360 degrees and find the amount of centering change. Make the adjustment to the center of the change.



20-5. Focus adjustment

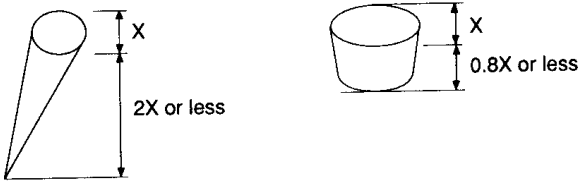
Signal	Monoscope signal
Adjustment	DY focus ring
Specification Value	Horizontal resolution is 350 lines or more.

Adjustment procedure:

Order	Procedure
1	Adjust focus ring for optimum focus. Confirm that the horizontal resolution satisfies the specification.

20-6. Diffraction adjustment

Signal	Dot pattern, Monoscope signal
Adjustment	DY diffraction adjustment ring
Specification Value	Refer to the illustration below.

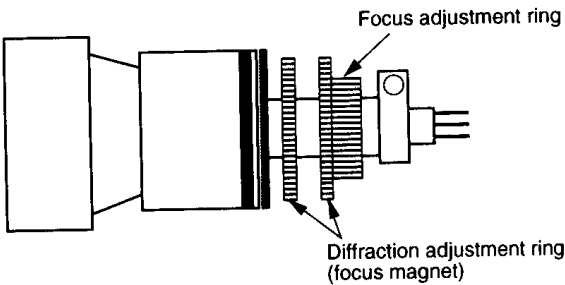


Adjustment procedure:

Order	Procedure
1	Adjust the diffraction adjustment ring so that tail of a dot must be smaller than 2 times of dot diameter, or the fan-shaped diffraction must smaller than the dot diameter.
2	If the focus and centering are affected by this adjustment, input monoscope signal and repeat focus and centering adjustments.

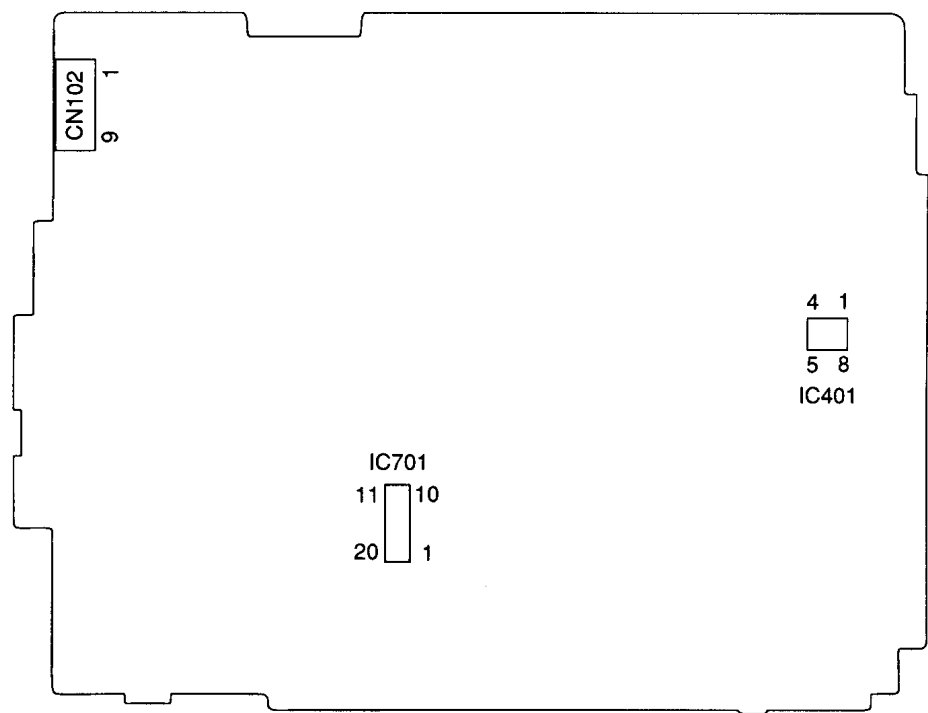
Related Adjustments:

- Focus adjustment
- Centering adjustment

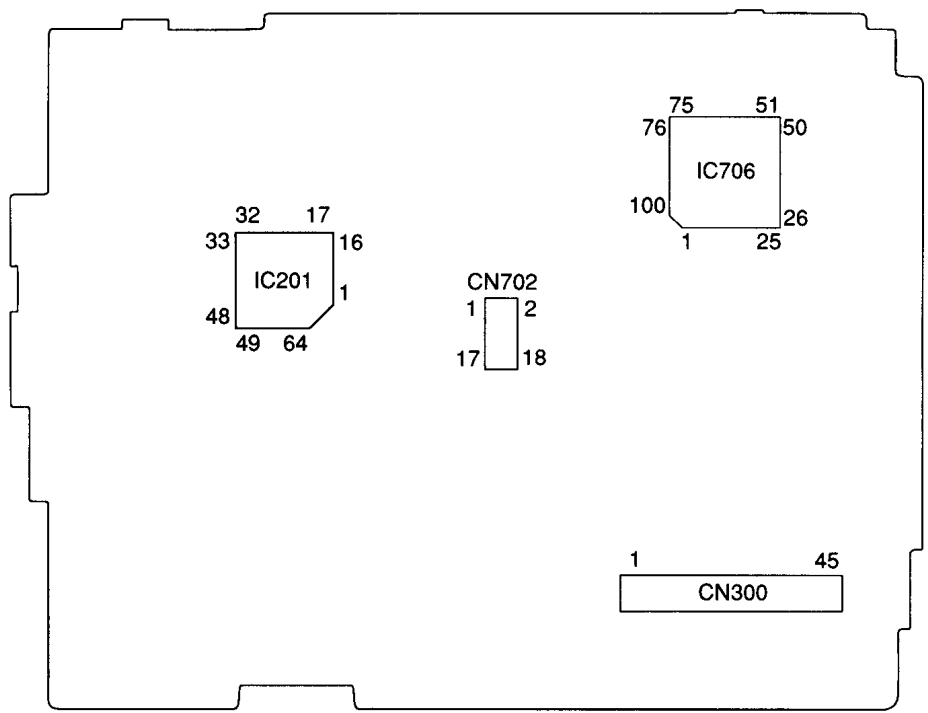


ARRANGEMENT DIAGRAM FOR ADJUSTMENT PARTS

VC-167P BOARD (SIDE A)



VC-167P BOARD (SIDE B)



## 6-2. MECHANISM SECTION ADJUSTMENTS

Refer to the separate "8 mm Video Mechanism Section Adjustment Manual VII **B Mechanism**" for adjustment, check procedure and mechanical parts replacement.

### 2-1. HOW TO OPERATE THE MECHANISM AFTER THE CASSETTE COMPARTMENT IS REMOVED

#### 1. How to load a cassette tape:

- 1) Refer to "1. Disassembly" and turn the main power on with the cabinet and camera section removed. (It enables to operate the mechanical deck.)
- 2) Connect the adjustment remote commander and set the NORM - ADJUST (HOLD) switch to ADJUST (ON) position.
- 3) Check that the main power is being supplied.
- 4) Select page: 6, address: 00, set data :01 and press the PAUSE button.
- 5) Select page: F, address: 02, set data: 01 and press the PAUSE button.
- 6) Turn off the power supply once, then turn it on.
- 7) Set the NORM - ADJUST (HOLD) switch to NORM (OFF) position. (The adjustment remote commander can be disconnected hereafter.)

- 8) Press the push-switch-1 knob in the direction of arrow which sets the machine into loading mode.

I PB, FF/REW and CUE/REV operations are possible.

- 9) After completing all steps of above operation, be sure to perform "4. Processing after operation".

#### 2. How to establish RECORD mode:

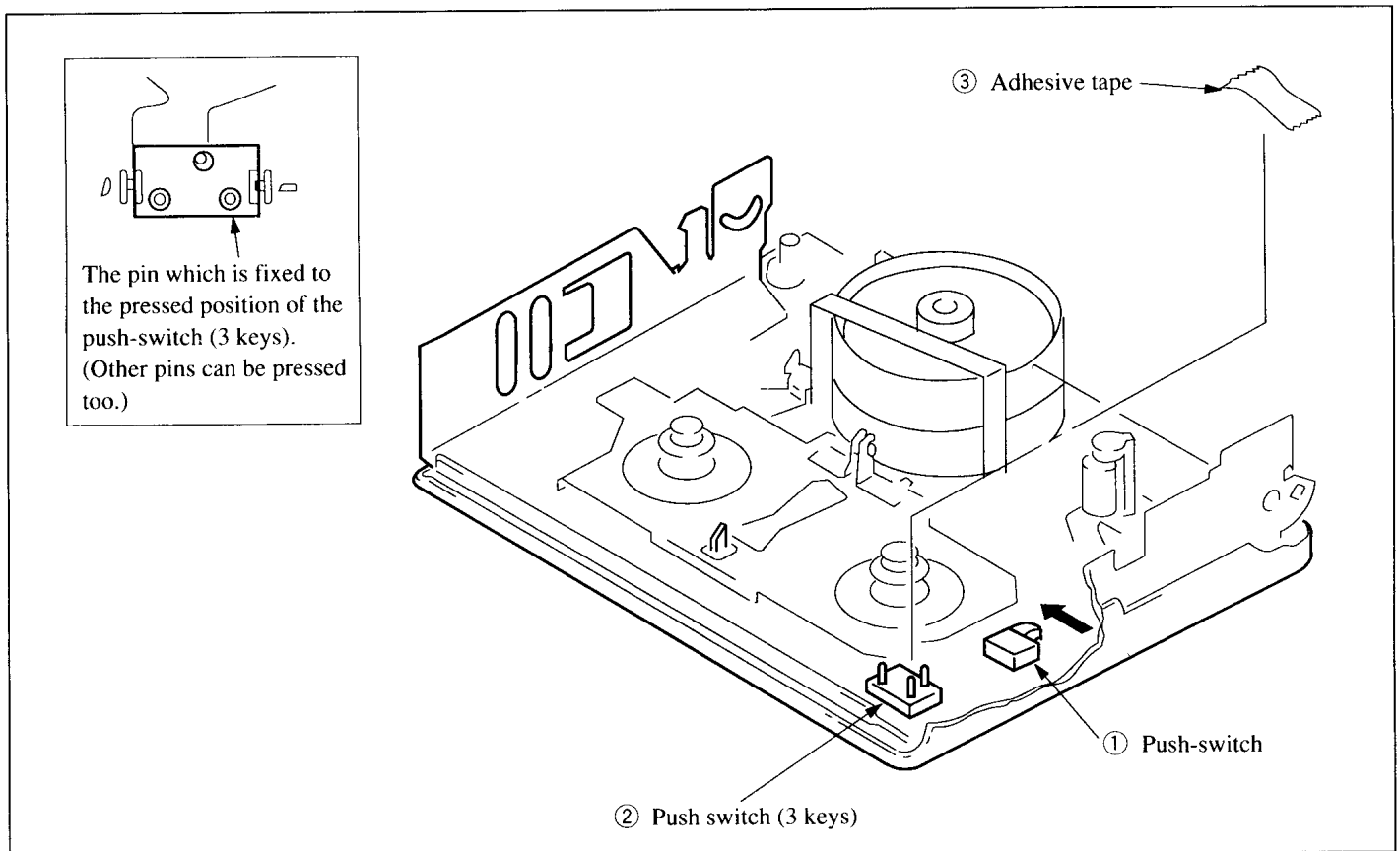
- 1) Press pin of the push-switch 2 (ON state) and keep the ON state by fixing with adhesive tape.
- 2) Turn the main power switch ON (select VTR or CAMERA position of camera).
- 3) Set the RECORD switch to ON.  
(When the test mode is selected, the rotation detection of the S and T reel tables is muted, and the top end sensor is disable which allow to run the tape.)

#### 3. How to eject a cassette tape:

- 1) Press the EJECT switch to ON.

#### 4. Processing after operation

- 1) Connect the adjustment remote commander and set the NORM - ADJUST (HOLD) switch to ADJUST (ON) position.
- 2) Select page 6, address: 00, set data: 01 and press the PAUSE button.
- 3) Select page: F, address: 02, set data: 00 and press the PAUSE button.
- 4) Remove the power supply to the machine.



## 2-2. TAPE PATH ADJUSTMENT

**Purpose:** Adjusts the head linearity.

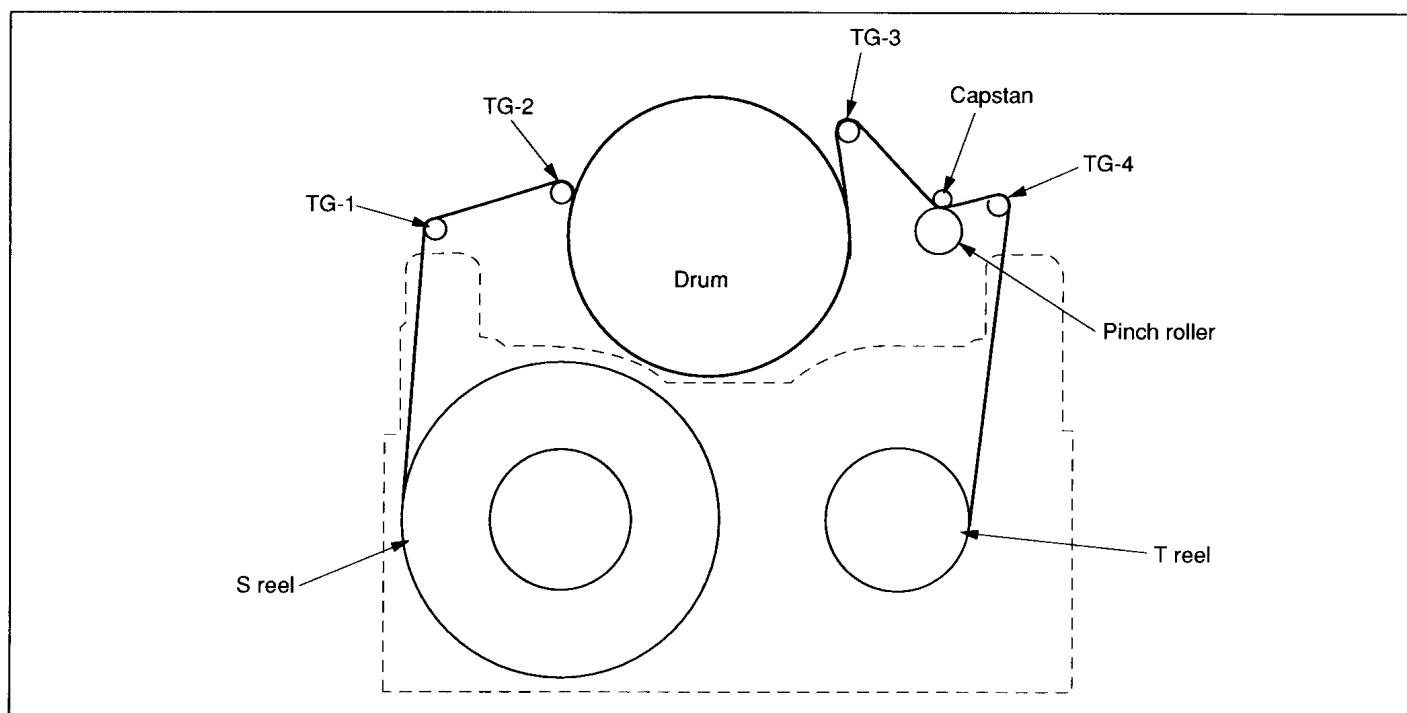
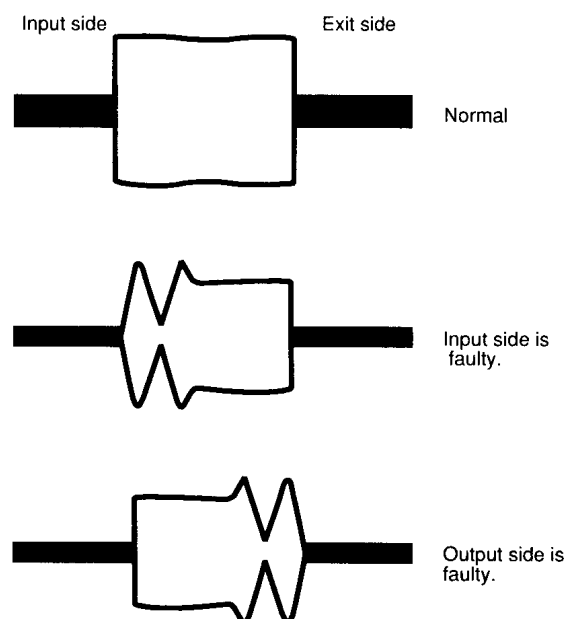
**Adjustment Error:** Noise appears on top and bottom of display when playing back the tape recorded by other machines.

### 1. Preparations for adjustments

- 1) Clean the tape running surface (tape guide, drum, capstan, pinch roller).
- 2) Connect the adjustment remote commander to the REMOTE terminal (JACK block).
- 3) Set the NORM - ADJUST (HOLD) switch to ADJUST (ON) position.
- 4) Check that the main power is being supplied.
- 5) Select page: 6, address: 00, set data :01 and press the PAUSE button.
- 6) Select page: F, address: 02, set data: 03 and press the PAUSE button.
- 7) Turn off the power supply once, then turn it on.
- 8) Connect an oscilloscope.  
CH1: VC-167P board CN102 pin ①.  
External trigger: VC-167P board CN102 pin ⑧.
- 9) Playback the tracking alignment tape (WR5-1CP).
- 10) Check to see that RF waveform is flat at input and exit sides on oscilloscope.  
If it not flat. Tape Path Adjustment" of the 8 mm Video Mechanism Section Adjustment Manual VII **B Mechanism** .
- 11) After completing the adjustment, perform "2-1-4. Processing after operation".

VC-167P board CN102

1	PB RF
2	REC 2
3	GND
4	EMPH IN
5	CAM Y IN
6	DEEMPH OUT
7	BPF ADJ
8	RF SWP
9	CAP FG



## 6-3. VIDEO SECTION ADJUSTMENT

When performing adjustments, refer to the layout diagrams for adjustment related parts beginning from page 6-64.

Perform the video section adjustment in the sequence as described.

### [Adjustment sequence]

- 1) Servo system adjustment
  - 1.SYNC LEVEL/BURST LEVEL adjustment.
  - 2.Switching position adjustment
  - 3.Capstan FG offset adjustment
- 2) Playback frequency response characteristics adjustment
- 3) DEMD OUT adjustment
- 4) YD OUT LEVEL adjustment
- 5) Chroma level check
- 6) PB Y level adjustment
- 7) FE OSC check
- 8) Emphasis input level adjustment
- 9) Y FM deviation adjustment
- 10) Y FM carrier frequency adjustment
- 11) Chroma emphasis fo adjustment
- 12) REC Y level adjustment
- 13) REC L level adjustment
- 14) REC C level adjustment



### 3-1. PREPARATIONS BEFORE ADJUSTMENT

The following measuring equipment are used for video section adjustment.

#### 3-1-1. Equipment required

- 1) Monitor TV
- 2) Oscilloscope, dual trace, 30 MHz bandwidth or more with delay mode function.  
(Use 10:1 probe unless otherwise specified.)
- 3) Frequency counter
- 4) Digital voltmeter
- 5) Audio generator
- 6) Audio level meter
- 7) Audio distortion meter
- 8) Audio attenuator
- 9) Regulated power supply
- 10) alignment tape
  - For tracking adjustment (WR5-1CP)  
Parts code: 8-967-995-07
  - For normal mode video frequency response adjustment (WR5-6C)  
Parts code: 8-967-995-17
  - For confirmation of normal mode operation for SP (WR5-5CSP)  
Parts code: 8-967-995-47  
or (WR5-4CSP)  
Parts code: 8-967-995-46  
for LP (WR5-4CL)  
Parts code: 8-967-995-56

#### 3-1-2. Precautions on adjustment

The EVF (electronic viewfinder) is not necessary for video section adjustment.

Remove the following connector to remove the EVF.

1. CF-40 board CN481 (pin-8)

The audio board (MA-238) board is not necessary except for "Audio System Adjustments". Remove the following connectors.

1. VC-167P board CN060 (pin-12)

After completing all adjustments, release the adjustment mode by either of the following two methods.

- 1) Remove the lithium battery. (In this case, data time and menu setting by users are erased. Input these data again.)
- 2) Return the data of the address: 00 on page:6 to 00. If the page: 2 data is changed, return the data to the original value.

#### 3-1-3. Adjustment connector (VC-167P Board CN102)

Some video section adjustment points are concentrated to the VC-167P board CN102. Connect the measuring equipment via the tool (Multi CPC: J-6082-311-A).

Pin No.	Signal Name
1	PB RF
2	REC 2
3	GND
4	EMPH IN
5	CAM Y IN
6	DEEMPH OUT
7	BPF ADJ
8	RF SWP
9	CAP FG

### 3-1-4. Equipment connection

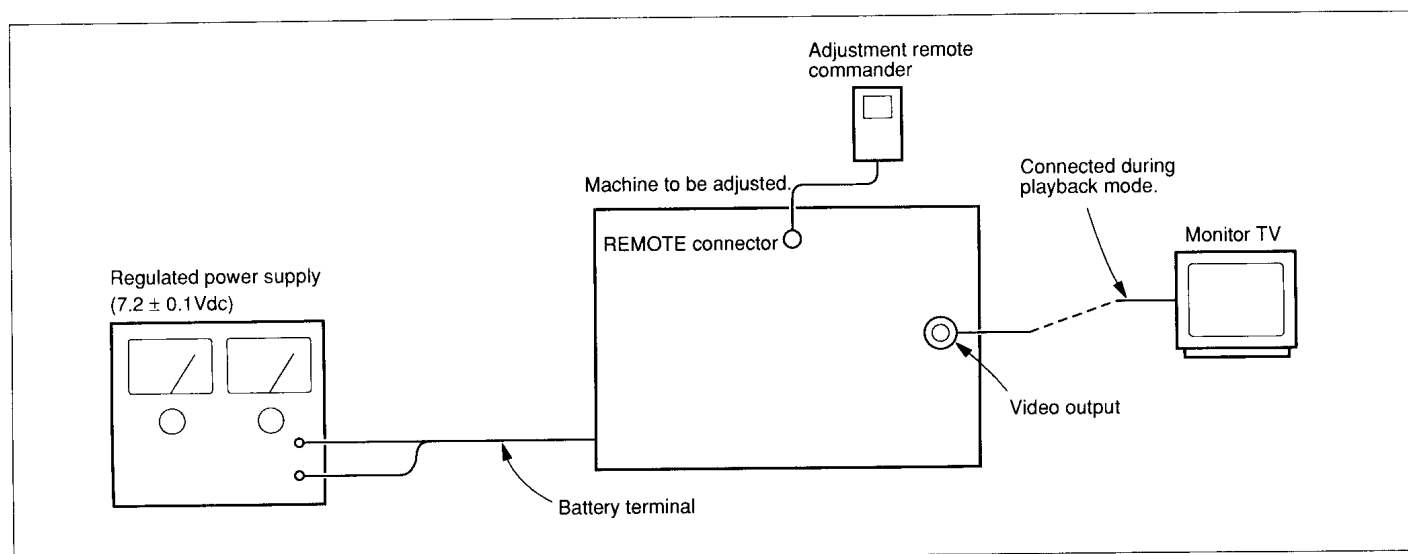


Fig.6-3-1.

### 3-1-5. Alignment tape

The following table shows the alignment tapes available.

Use the tape specified in the signal column for each adjustment.

If tape type is not specified in the adjustments which use the "Operation Check" tape, use any type of tape for the checking purpose.

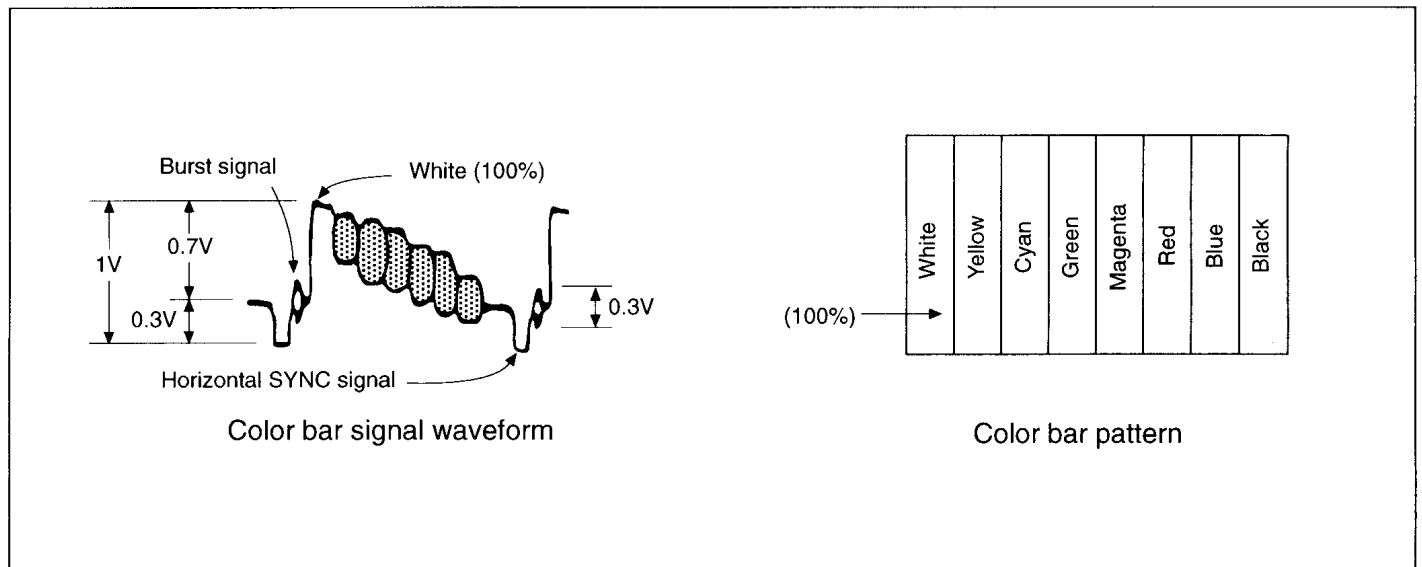
Name	Record Mode	Tape Type	Tape Speed	Use
Tracking WR5-1CP	Normal	MP	SP	Tape path adjustment Switching position adjustment
Video frequency response adjustment WR5-6C	Normal	MP	SP	Frequency response adjustment
Operation check (SP mode) WR5-5CSP	Normal	MP	SP	Operation check
Operation check WR5-4CL	Normal	MP	LP	

Note: Tape type

MP — Metal particle tape

The color bar signal which is recorded in the alignment tape.

**Note:** Measured at video input/output connector (across  $75\ \Omega$  termination).



Color bar signal of alignment tape

### 3-1-6. Output level and impedance

Video output      Pin jack  
Output signal: 1 V p-p,  $75\ \Omega$  unbalanced,  
sync negative

Audio output      Pin jack  
Input level: -7.5 dBs (across  $47\ k\Omega$  load))  
Output impedance:  $2.2\ k\Omega$  or less

**3-2. ADJUSTMENT POINTS WHEN MAJOR PARTS ARE REPLACED**

**1. When drum is replaced:**

- “Tape Path Position Adjustment” of mechanical section adjustment
- “PB RF frequency response characteristics adjustment” of the video section adjustment
- “Switching position adjustment” of the servo section adjustment

**3-3. POWER SUPPLY SYSTEM ADJUSTMENT**

**1. Power supply voltage check (VC-167P board)**

Mode	Camera record
Subject	Any subject
Measuring Equipment	Digital voltmeter
MT5V check	
Measuring Point	CN300 pin③⑥
Specification Value	$5.0 \pm 0.15\text{Vdc}$
DIG 3V check	
Measuring Point	CN300 pin③⑩
Specification Value	$3.16 \pm 0.1\text{Vdc}$
AU 3 V check	
Measuring Point	CN501 pin⑤
Specification Value	$3.18 \pm 0.1\text{Vdc}$
EVF 5V check (camera mode)	
Measuring Point	CN300 pin④①
Specification Value	$4.85 \pm 0.15\text{Vdc}$
EVF15 V check	
Measuring Point	CN300 pin④⑩
Specification Value	$14.95 \pm 0.4\text{Vdc}$

## 2. VTR & CAM mode ON

Mode	Stop
Signal	Any signal
Adjustment Page	F
Adjustment Address	02

### Adjustment procedure:

Order	Page	Address	Data	Procedure
1				Set the remote commander (RM-95) to HOLD (adjustment position), and turn on the UNREG power supply.
2	6	00	01	After setting the data, press the PAUSE button. (Preparation)
3	F	02	03	After setting the data, press the PAUSE button.
4				Turn off the UNREG power supply once, then turn it on.

### How to cancel the VTR & CAM mode ON.

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button.
2	F	02	00	After setting the data, press the PAUSE button.
3				Turn off the UNREG power supply once, then turn it on.

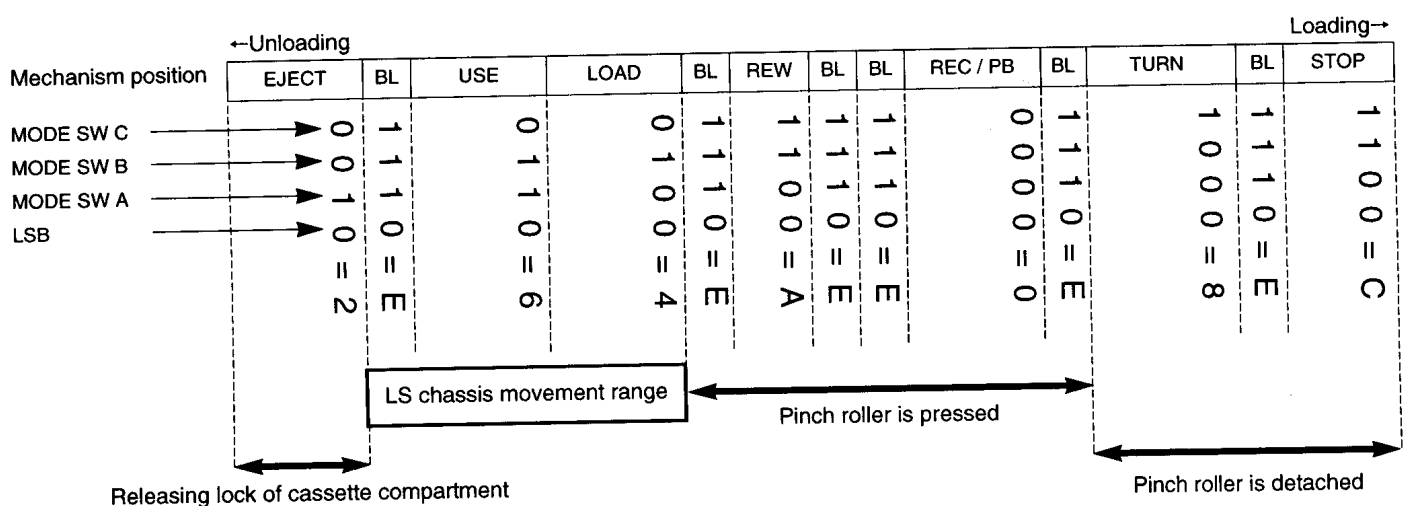
### 3. EMG code (Emergency code)

The emergency codes are stored in the addresses: E4, E8 and EC corresponding to the type of errors occurred. Types of error code are shown in the following table.

Code	Error Status
00	No error
10	Loading motor error during loading
11	Loading motor error during unloading
20	T reel error during unloading
21	S reel error during unloading
22	T reel error in normal mode
23	S reel error in normal mode
30	FG error during capstan startup
31	FG error during capstan normal speed
40	FG error during drum startup
41	FG error during drum startup
42	FG error during normal rotation of drum
43	Not used
44	Phase error during normal rotation of drum

### 4. MSW code

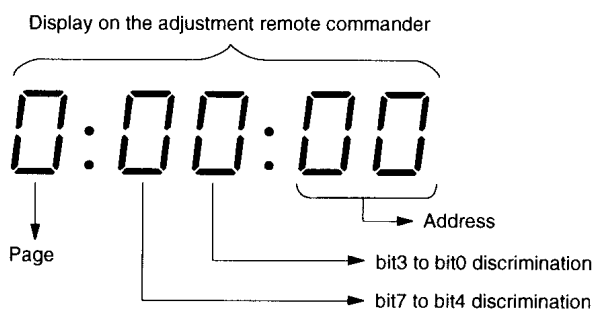
- The lower digit data of the page F: address: E6, EA and EE indicate the MSW code (mode switch code) when an error occurs.
- The upper digit data of the page F: address: E6, EA and EE indicate the MSW code (mode switch code) of mode transition (mode SW code before mode transition) when an error occurs.
- The lower digit data of the page F: address: E7, EB and EF indicate the MSW code (mode switch code) of transition target (code to which the machine is going to enter) when an error occurs.



Mechanism	MSW	Detail of Content
Position	Code	
EJECT	2	The position where the cassette compartment lock is released. The end position in the unthread-end direction. The mechanism does not move any more in the direction of unloading direction.
BL	E	Blank code. The code which separates a code from another code. The machine does not stop at the code while is it operating.
USE	6	EJECT completed position. If a cassette is ejected, it stops at this position. If mechanism moves in the loading direction, the TG1 guide and the TG9 guide start moving.
LOAD	4	The code during loading and unloading. This code is output while the LS chassis is moving.
REW	A	REW position. The position to activate the REW and FR/REV.
RP	0	PB, REC, CUE REV and PAUSE position. The pinch roller is pressed and the tension regulator is turned ON.
TURN	8	The position which is used to move the swing gear from S to T or from T to S. Normal STOP position.
STOP	C	The pinch roller is detached, tension regulator is turned OFF, and both reels are braked. Mechanism does not move any more in the loading direction.

## 5. Bit value discrimination

Bit values must be discriminated using the display data of the adjustment remote commander for the following items. Use the table below to discriminate if the bit value is "1" or "0".



(Example) If the remote commander display is "8E", bit value from bit 7 to bit 4 can be discriminated from the column ①, and those from bit 3 to bit 0 from column ②.

①

②

Display on the Adjustment Remote Commander	Bit value			
	bit3 or bit7	bit2 or bit6	bit1 or bit5	bit0 or bit4
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
A( <i>H</i> )	1	0	1	0
B( <i>b</i> )	1	0	1	1
C( <i>L</i> )	1	1	0	0
D( <i>d</i> )	1	1	0	1
E( <i>E</i> )	1	1	1	0
F( <i>F</i> )	1	1	1	1

## 6. Initializing the emergency code area

(Caution) Perform the initializing operation only when the past emergency codes can be deleted.

### Operating procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	6	11	00	After setting the data, press the PAUSE button.
3	6	01	4D	After setting the data, press the PAUSE button.
4	6	11	01	After setting the data, press the PAUSE button.
5	F	E4~EF	00	After setting the data, press the PAUSE button.
6	6	01	00	After setting the data, press the PAUSE button.
7	6	00	00	After setting the data, press the PAUSE button. (End)

## 7. LED check

Data	Operation
00	Normal
10	Tally LED lights.

### Operating procedure:

Order	Page	Address	Date	Procedure
1				Turn CAM POWER ON.
2				Check LED.
3	2	00	00	After setting the data, press the PAUSE button.
4	2	A0	10	Tally LED light.



## 8. Key input check



Bit	Key Switch	Switch Condition
0	Date (+)	"1" =OFF "0" =ON
1	Time	
2	Cassette eject	
3	Video power supply	
4	CC DOWN	
5	Start/Stop	
6	Camera power supply	

### Operating procedure:

Order	Page	Address	Data	Procedure
1	2	00	3F	After setting the data, press the PAUSE button.
2	2	01		ON/OFF of each key switch can be known by discriminating the bit value of each display data.

## 9. Key input check (A/D port)

• VC-167P board

Display data Address	00~20	21~60	61~A0	A1~E0	E1~FF
2E (KEY AD0: IC303 ⑧2)	• STOP (S307)	• REW (S305)	• FF (S306)	• PAUSE (S304)	No key input
2F (KEY AD1: IC303 ⑧3)	• PB (S303)	• EDIT SEARCH (-) (S302)	• EDIT SEARCH (+) (S301)		No key input
30 (KEY AD2: IC303 ⑧4)	COUNTER RESET (CF-40 board S482)	TITLE (CF-40 board S301)			No key input
31 (S/S MODE SW: IC303 ⑧5)	START/STOP MODE (CF-40 BOARD : S485)				NORMAL
	5 SEC REC				
32 (PROGRAM AE: IC303 ⑧6)	PROGRAM AE (CF-40 BOARD : S489)				No key input
	AE PORTRAIT	AE SPORT	AE SHUTTER	AE TWILIGHT	

**Operating procedure:**

Order	Page	Address	Data	Procedure
1	2	00	01	After setting the data, press the PAUSE button.
2	2	2E~32		From the display data of each address, it can be known which key is being pressed.

**10. Individual operation of drum, capstan and loading motor**

Data	Operation
00	Normal
02	Drum rotation in normal direction
06	Capstan rotation in normal direction
08	Capstan rotation in reverse direction
0A	Loading motor rotation in normal direction
0C	Loading motor rotation in reverse direction
01	All motors stop.
03	
05	
07	
09	
0B	
0D	
0F	

**Operating procedure:**

Order	Page	Address	Data	Procedure
1	7	00	02	After setting the data, press the PAUSE button.
2	7	0E	01	Individual operation of motors is approved.
3	7	11		Motor can be operated individually by setting the above described data.
4				Turn the main power (7.2 V) OFF.

### 3-4. SERVO SYSTEM ADJUSTMENTS

#### 1. SYNC level and BURST level adjustments

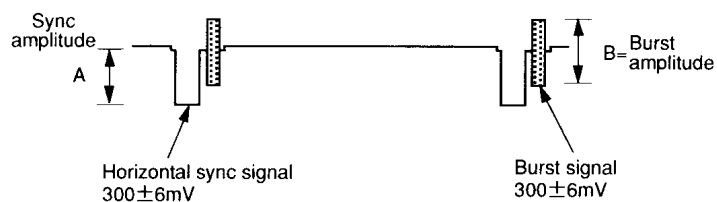
**Purpose:** Adjust the sync and burst level of the camera output to the specified values.

**Adjustment error:** The playback machine can lose lock of the servo systems if the sync level is too low.  
The playback color will become too thick if the burst level is low.

Mode	Camera record
Subject	Color bar chart: standard picture frame
Measurement point	VIDEO output terminal (terminated in $75\Omega$ )
Measuring equipment	Oscilloscope
Adjustment page	F
Adjustment address	28 (SYNC LEVEL) 29 (BURST LEVEL)
Specifications	A = $300 \pm 6$ mV (SYNC LEVEL) B = $300 \pm 6$ mV (BURST LEVEL)

#### Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	6	01	03	After setting the data, press the PAUSE button.
3	F	28		Change the data using the PLAY and STOP buttons until the SYNC LEVEL (A) satisfies the specification.
4				Press the PAUSE button.
5	F	29		Change the data using the PLAY and STOP buttons until the BURST LEVEL (B) satisfies the specification.
6				Press the PAUSE button.
7	6	01	00	After setting the data, press the PAUSE button.
8	6	00	00	After setting the data, press the PAUSE button. (End)



2. Switching position adjustment

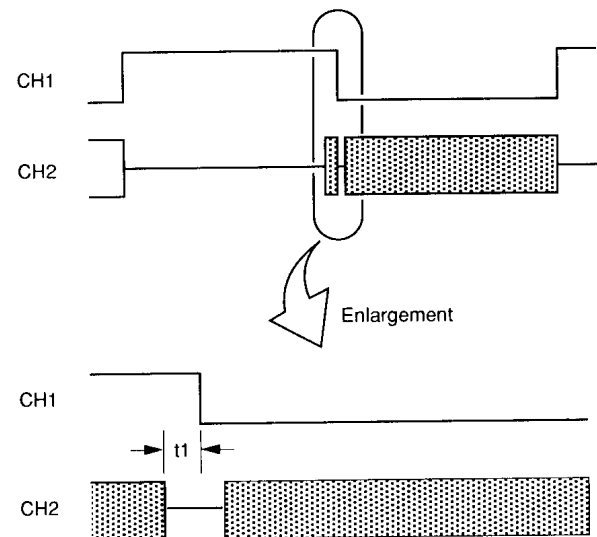
Purpose: Removes vertical mechanical error of head assembling.

Adjustment error: Skew picture.

Mode	Playback
Signal	Alignment tape : For adjustment tracking (WR5-1CP)
Measurement Point	CH1 : ⑧ of CN102 (RF SWP) CH2 : ① of CN102 (PB RF)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	0A 0B
Specification Value	t1= 0 ± 10 μ sec

Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	0B	80	Initial setting.
3	F	0B		Change the data with the PLAY and STOP buttons, and minimize t1.
4				Press the PAUSE button.
5	F	0A		Change the data with the PLAY and STOP buttons, and minimize t1.
6				Press the PAUSE button.
7				Check that t1 satisfies the specified value. If not, repeat steps 3 to 6 in order.
8	6	00	00	After setting the data, press the PAUSE button. (End)

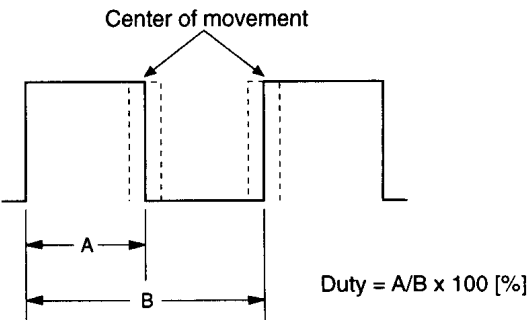


3. Capstan FG offset adjustment

Purpose: Adjusts duty ratio of capstan FG signal

Adjustment error: Jitter can increase.

Mode	CAM-REC (SP)
Signal	Any signal
Measurement Point	CN102 pin⑨
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	12
Specification Value	Duty = 50 ± 1.5%



Adjustment procedure:

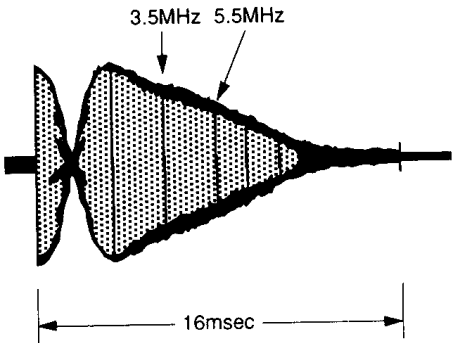
Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	12	80	After setting the data, press the PAUSE button.
3	F	12		Change data using PLAY and STOP buttons so that the duty ratio A/B satisfies the specification.
4				Press the PAUSE button.
5	6	00	00	After setting the data, press the PAUSE button. (End)

3-5.    **PLAYBACK FREQUENCY RESPONSE  
CHARACTERISTICS ADJUSTMENT**

Purpose:                Remove variation of picture quality between  
                             heads due to difference of characteristics.

Adjustment error: Flicker or over-modulation of playback  
                             picture.

Mode	Playback
Signal	Alignment tape: Normal mode frequency response characteristics adjustment (WR5- 6C)
Measurement Point	Check connector (CH1: CN102 pin① (PB RF))
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	22 23
Specification Value	3.5 MHz level : 5.5 MHz level = 4 : (3.0 ±0.2)



**Adjustment procedure:**

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	22		Change data using PLAY and STOP buttons to adjust the level ration between 3.5 MHz level and 5.5 MHz level of the PB RF waveform of channel “1a” satisfies the specification. Press the PAUSE button. Playback mode.
3	F	23		Adjust the channel “2a” in the same way (address 23). Press the PAUSE button. Playback mode.
4	6	00	00	After setting the data, press the PAUSE button. (End)

3-6. DEMD OUT LEVEL ADJUSTMENT

Purpose: The playback video level is kept to constant level.

Adjustment error: The playback picture can be brighter or darker than normal picture.

Mode	Playback
Signal	Alignment tape : Normal mode (WR5-5CSP)
Measurement Point	IC201 pin⑳ or CN102 pin⑥
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	1D
Specification Value	$A=0.50\pm0.01V_{p-p}$

Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	1D		Change data using PLAY and STOP buttons so that the Y signal level (A) satisfies the specification.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

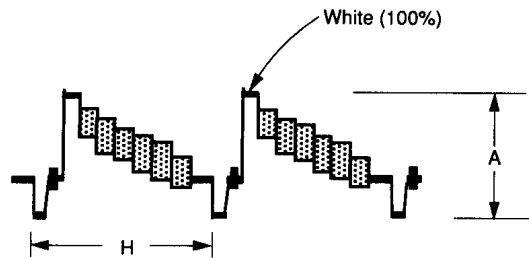


Fig. 6-3-1

3-7. YD OUT LEVEL ADJUSTMENT

**Purpose:** Minimizes the residual chroma component of Y comb filter output signal.

**Adjustment error:** Chroma flicker at video out (pin jack) of VTR overall characteristics. Color variations also significant.

Mode	Playback
Signal	Alignment tape : Normal mode (WR5-5CSP)
Measurement Point	CN102 pin⑤
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	24
Specification Value	A=0.50±0.01Vp-p

**Note :** Minimize the residual chroma to the smallest amplitude

**Adjustment procedure:**

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	24		Change data using PLAY and STOP buttons so that the Y signal level (A) satisfies the specification.
3				
4				Press the PAUSE button.
5	1	00	00	After setting the data, press the PAUSE button. (End)

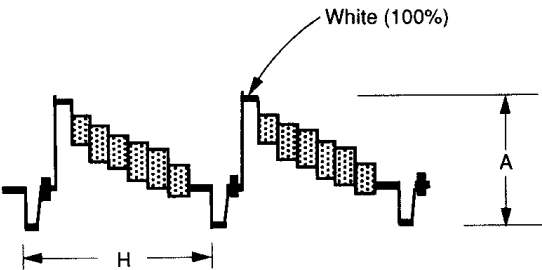


Fig. 6-3-2

**Related Adjustments:**

“Emphasis input level adjustment”, “PB Y level adjustment”, “Y FM carrier frequency adjustment”



3-8. PB CHROMA LEVEL CHECK

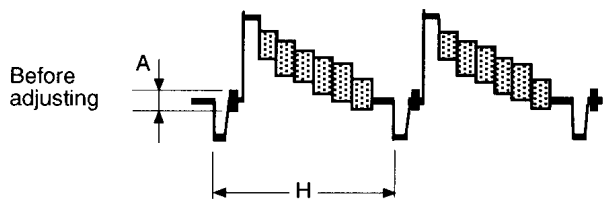
Purpose: The playback chroma level is kept to constant level.

Adjustment error: Color of playback picture can be thinner or thicker than normal picture.

Mode	Playback
Signal	Alignment tape: color bar segment of operation check tape <ul style="list-style-type: none"><li>• Normal mode WR5-5CSP</li></ul>
Measurement Point	CN102 pin⑥
Measuring Instrument	Oscilloscope
Adjustment Page	
Adjustment Address	
Specification Value	$A=150\pm15\text{mVp-p}$ (BURST LEVEL)

Adjustment procedure:

Order	Page	Address	Data	Procedure
1				Playback the color bar segment of the normal mode alignment tape (WR5-5CSP).
2				Check that the burst signal level satisfies the specification.

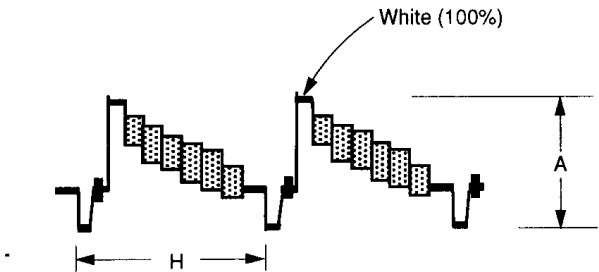


3-9. PB Y OUT LEVEL ADJUSTMENT

**Purpose:** Adjusts playback video level for the specification value.

**Adjustment error:** Playback picture can be too brighter or too darker than normal picture.

Mode	Playback
Signal	Alignment tape: color bar segment of operation check tape • Normal mode WR5-5CSP
Measurement Point	VIDEO output terminal (terminated in 75Ω)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	1B
Specification Value	$A=1.00\pm0.05V_{p-p}$



Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2				Playback the color bar segment of the normal alignment tape (WR5-5CSP playback)
3	F	1B		Change data using PLAY and STOP buttons so that the playback signal level (A) satisfies the specification.
4				Press the PAUSE button.
5	6	00	00	After setting the data, press the PAUSE button. (End)

3-10. FE OSC CHECK

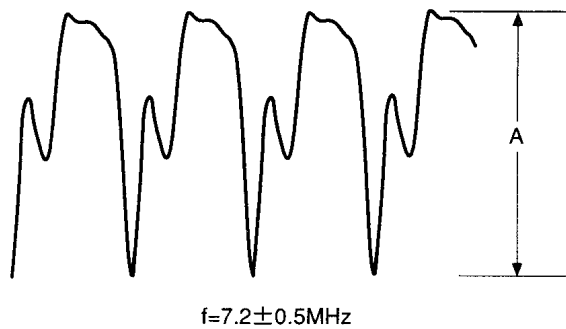
Purpose: Check the oscillating frequency and level of the flying erase (FE) signal.

Adjustment error: If REC-PAUSE recording is repeated, un-erased area is left in the junctions between the editings which results in increase of noise or previous picture can be seen.

Mode	CAM-REC
Signal	Any signal
Measurement Point	CN101 pin ⑪
Measuring Instrument	Oscilloscope and frequency counter
Adjustment Page	
Adjustment Address	
Specification Value	A=7.0Vp-p or more (MP mode) f=7.2±0.5MHz (MP mode)

Adjustment procedure:

Order	Page	Address	Data	Procedure
1				Insert a normal MP type tape.
2				Make a recording.
3				Check that the FE signal level satisfies the specification.
4				Check that the FE signal frequency satisfies the specification.



3-11. EMPHASIS INPUT LEVEL ADJUSTMENT

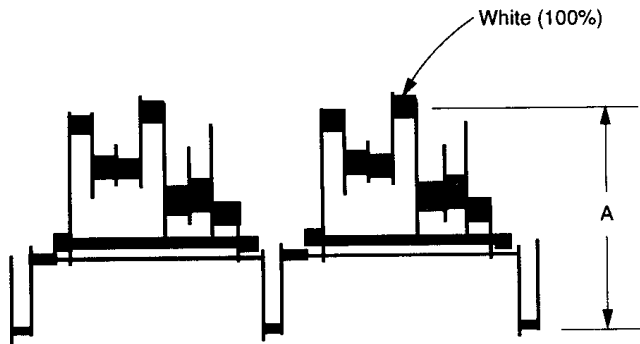
Purpose: Adjusts the record emphasis characteristics to the specification value.

Adjustment error: Luminance signal smear, blurred picture, too much emphasized edge of overall video characteristics.

Mode	CAM-REC
Signal	Color bar chart
Measurement Point	· CN102 PIN④ · VIDEO output terminal (terminated in 75Ω)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	1A
Specification Value	$A=(V_o \times 0.96 \times 500) \text{ mVp-p} \pm 2\%$

Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	6	01	47	After setting the data, press the PAUSE button.
3				Measure amplitude of the VIDEO OUT. The measured value is “Vo”[V].
4	F	1A		Change data using PLAY and STOP buttons so that the Y signal level at CN102 pin④ (A) satisfies the specification.
5				Press the PAUSE button.
6	6	01	00	After setting the data, press the PAUSE button.
7	6	00	00	After setting the data, press the PAUSE button. (End)

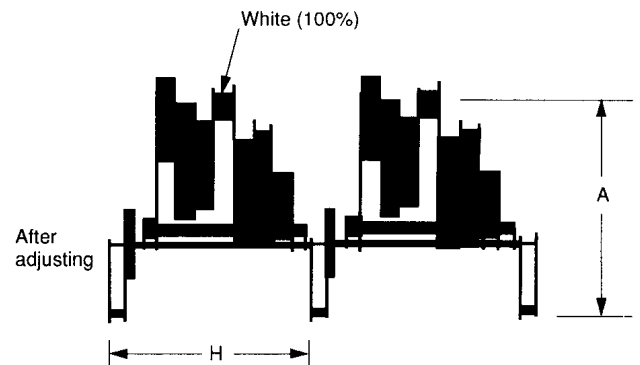


### 3-12. Y FM DEVIATION ADJUSTMENT (NOTE)

**Purpose:** Adjusts the FM signal to be recorded on tape to the 8 mm format. (Adjusts the frequency deviation of normal mode Y FM signal.)

**Adjustment error:** Too bright or too dark overall picture.  
Overmodulation picture. (If deviation is too wide, or too narrow.)

Mode	CAM-REC and playback
Signal	Color bar chart
Measurement Point	<ul style="list-style-type: none"> <li>· CN102 pin②</li> <li>· VIDEO output terminal (terminated in 75Ω)</li> </ul>
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	17
Specification Value	$A = (V_o \times 0.96) V_{p-p} \pm 2\%$



#### Related Adjustments:

“Normal mode Y FM deviation adjustment”

**Note :** The “Emphasis input level adjustment”, “PB Y level adjustment”, must have already been completed.

#### Adjustment procedure:

Order	Page	Address	Data	Procedure
1				Insert a normal MP type tape.
2	6	00	01	After setting the data, press the PAUSE button. (Preparation)
3	6	01	47	After setting the data, press the PAUSE button.
4				Shoot and record the color bar chart. The video out level at that setup is "Vo".
5				Playback the recorded signal.
6				Compare the playback signal level (A) with the specification value. If the specification value is satisfied, the adjustment is complete.
7	F	17		If the specification value is satisfied, change data using PLAY and STOP buttons. <ul style="list-style-type: none"> <li>• If the playback signal level is bigger than the specification value, decrease the data.</li> <li>• If the playback signal level is smaller than the specification value, increase the data.</li> </ul>
8				Press the PAUSE button.
9				Return to step 4.
10	6	01	00	After setting the data, press the PAUSE button.
11	6	00	00	After setting the data, press the PAUSE button. (End)

### 3-13. Y FM CARRIER FREQUENCY ADJUSTMENT

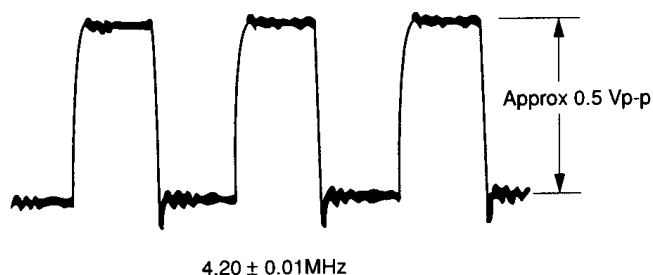
**Purpose:** Adjusts the FM signal to be recorded on tape to the 8 mm format. (Adjusts the carrier frequency of normal mode Y FM signal.)

**Adjustment error:** (If frequency is low) Overall picture will be blurred signal. (If frequency is high) Overall picture will have black streaking noise. S/N will be deteriorated.

Mode	CAM-REC
Signal	Any signal
Measurement Point	IC201 pin④①
Measuring Instrument	Frequency counter,Oscilloscope
Adjustment Page	F
Adjustment Address	19
Specification Value	$4.20 \pm 0.01\text{MHz}$

#### Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	6	01	43	After setting the data, press the PAUSE button.
3	F	19		Change data using PLAY and STOP buttons so that the Y signal level (A) satisfies the specification. (Record mode)
4				Press the PAUSE button.
5	6	01	00	After setting the data, press the PAUSE button.
6	6	00	00	After setting the data, press the PAUSE button. (End)



3-14. CHROMA EMPHASIS fo ADJUSTMENT

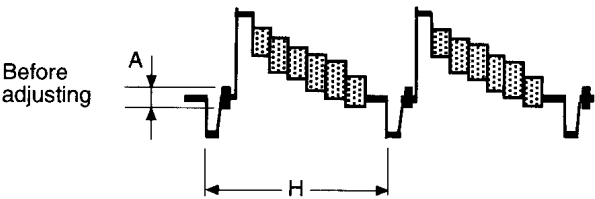
Purpose: Adjust fo of the chroma emphasis to the specified frequency range.

Adjustment error: The bust and chroma level becomes too big during playback.

Mode	Playback
Signal	Color bar signal (WR5-5CSP)
Measurement Point	· VIDEO output terminal (terminated in 75Ω)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	1E
Specification Value	Minimizes the chroma component (A in the following diagram)

Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	1E		Change data so that the chroma component (A) is minimized.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)



### 3-15. REC Y LEVEL ADJUSTMENT

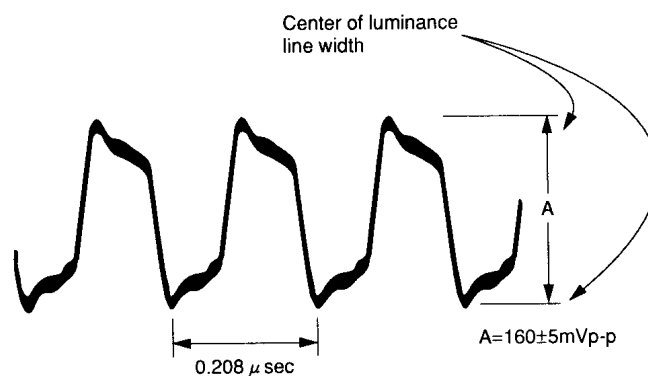
**Purpose:** Maintains a constant level of Y FM, chroma AFM and ATF signals when recording on tape.

**Adjustment error:** (If level is low) Poor S/N of playback picture  
(If level is high) Black streaking noise appears.

**Connection:** Connect CN102 pin⑧ (RF SWP) to GND.

Mode	CAM-REC (SP)
Signal	No signal
Measurement Point	CN102 pin② (check connector)
Measuring Instrument	Oscilloscope (Note)
Adjustment Page	F
Adjustment Address	1F
Specification Value	$A=160\pm5\text{mVp-p}$

**Note:** Use the MP type tape. If an oscilloscope has the bandwidth limiting switch, set to on position.



#### Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2				Insert the MP tape to establish record mode.
3	6	01	43	After setting the data, press the PAUSE button.
4	F	1F		Change data using PLAY and STOP buttons so that the REC Y RF level (A) satisfies the specification.
5				Press the PAUSE button.
6	6	01	00	After setting the data, press the PAUSE button.
7	6	00	00	After setting the data, press the PAUSE button. (End)



3-16. REC L LEVEL ADJUSTMENT

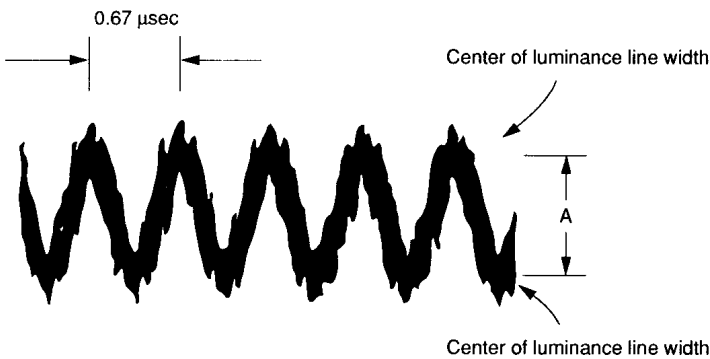
Purpose: Maintains a constant level of chroma, AFM and ATF signals when recording on tape.

Adjustment error: If level is low, audio distortion increases, ATF servo loses lock, and chroma S/N deteriorates.  
If level is high, Y S/N deteriorates and white streaking noise appears.

Mode	CAM-REC (SP)
Signal	No signal
Measurement Point	CN102 pin② (check connector)
Measuring Instrument	Oscilloscope Frequency bandwidth limitation: 20 MHz OFF
Adjustment Page	F
Adjustment Address	21
Specification Value	A=8.494±0.3mV (AFM Level)

Adjustment procedure:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	6	01	43	After setting the data, press the PAUSE button.
3	F	21		Change data using PLAY and STOP buttons so that the AFM signal level (A) satisfies the specification.
4				Press the PAUSE button.
5	6	01	00	After setting the data, press the PAUSE button.
6	6	00	00	After setting the data, press the PAUSE button. (End)



3-17. REC C LEVEL ADJUSTMENT

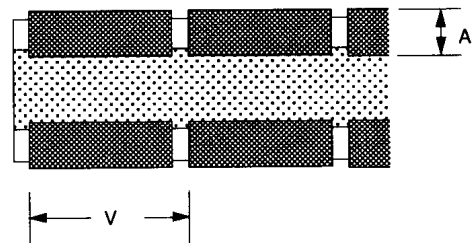
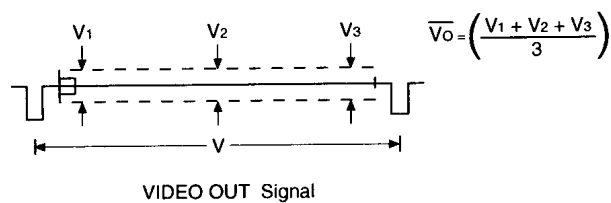
Purpose: Maintains a constant chroma level when recording on tape.

Adjustment error: If level is low, overall S/N deteriorates.  
If level is high, S/N of Y signal at deep colo deteriorates and white streaking noise appears.

Mode	CAM-REC
Signal	White pattern (See page 6-2)
Measurement Point	· CN102 pin② (Check connector) · VIDEO output terminal (terminated in 75Ω)
Measuring Instrument	Oscilloscope
Adjustment Page	F
Adjustment Address	20
Specification Value	$A=(28.5 \times \frac{\overline{V_o}}{700})mVp-p \pm 2mVp-p$

Adjustment procedure:

Order	Page	Address	Data	Procedure
1				Shoot the all white pattern to the full picture frame.
2	6	00	01	After setting the data, press the PAUSE button. (Preparation)
3	6	01	45	After setting the data, press the PAUSE button.
4				Measure the chroma output level of the VIDEO OUT connector. Obtain the average value of three points (beginning, middle, end) of a vertical period. Call the average value $\overline{V_o}$ (mV).
5	F	20		Change data using PLAY and STOP buttons so that the REC signal at CN102 pin② amplitude (A) satisfies the specification.
6				Press the PAUSE button.
7	6	01	00	After setting the data, press the PAUSE button.
8	6	00	00	After setting the data, press the PAUSE button. (End)



6-4. AUDIO SYSTEM ADJUSTMENT

- Use the alignment tape (WR5-5CSP) for audio system adjustment.
- Connect an audio input signal from VC-167P board CN501 as shown in Fig.6-4-1.

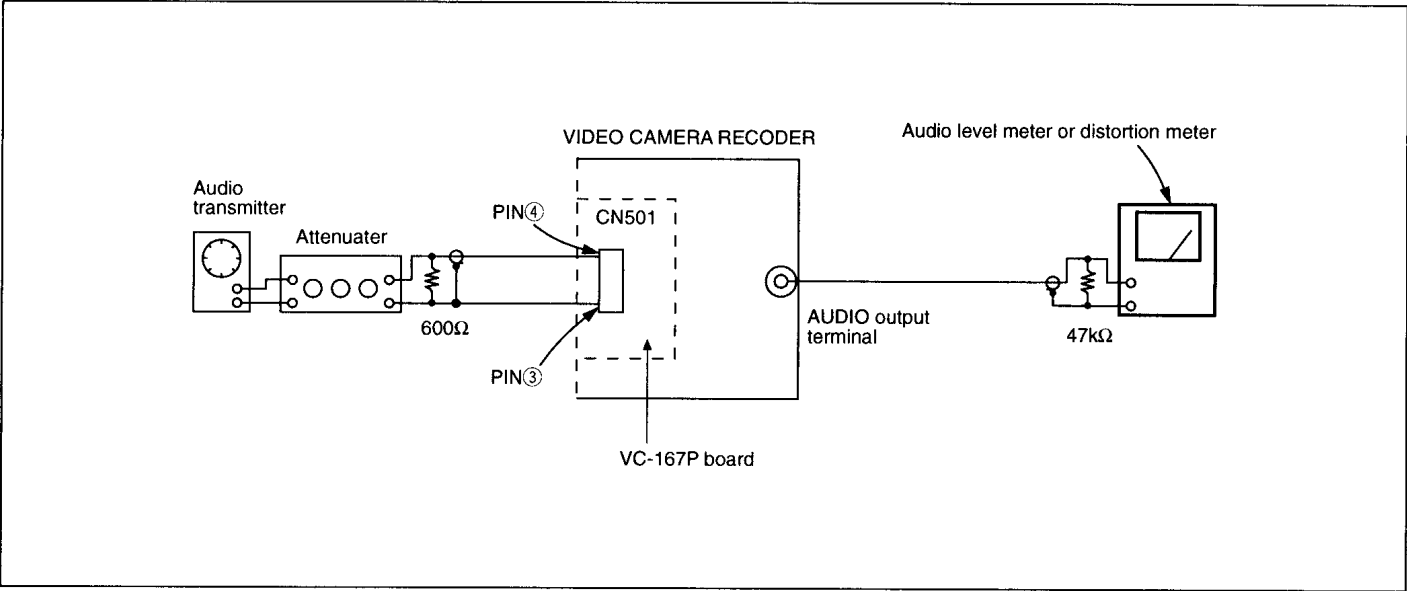


Fig.6-4-1

4-1. EE-OUTPUT LEVEL CHECK

Mode	Record
signal	CN501 PIN ④ INPUT 400 Hz, − 38 dBs
	Audio input from CN501 pin④
Measurement Point	AUDIO output terminal (no load)
Measuring Instrument	Audio level meter
Specification Value	− 7.5 ± 2.0 dBs

Check procedure

Order	Procedure
1	Check that 400 Hz signal level satisfies the specification.

## 4-2. 1.5MHz DEVIATION ADJUSTMENT

Purpose: 1.5MHz deviation adjustment. Error in this adjustment value means loss of tape inter change ability.

Mode	Playback
Signal	Alignment tape : For checking operations (WR5-5CSP)
Measurement	AUDIO output terminal.
Measuring Instrument	Oscilloscope, level meter
Adjustment Page	F
Adjustment Address	13
Specified Value	$-7.5 \pm 0.5\text{dBs}$

### Adjustment method:

Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2	F	13		Change the data with the PLAY and STOP buttons, and adjust the 400Hz signal level to specified value.
3				Press the PAUSE button.
4	6	00	00	After setting the data, press the PAUSE button. (End)

### 4-3. BPF fo ADJUSTMENT

Purpose: Optimizes fo of BPF inside IC.

Adjustment error: Incorrect discrimination of monaural/stereo  
and increase of noise at high output of audio  
volume are resulted.

Mode	Playback
Signal	Alignment tape:(WR5-5CSP)
Measurement Point	AUDIO output terminal
Measuring Instrument	Distortion meter
Adjustment Page	F
Adjustment Address	15
Specification Value	Distortion : 1% or less.

#### Adjustment procedure:

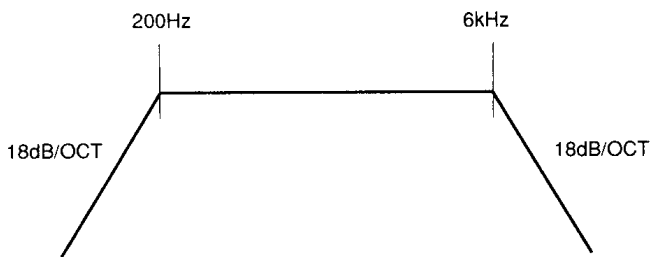
Order	Page	Address	Data	Procedure
1	6	00	01	After setting the data, press the PAUSE button. (Preparation)
2				Playback the 400 Hz segment of the WR5-5CSP alignment tape.
3	F	15		Change data using PLAY and STOP buttons so that distortion factor is minimized.
4				Press the PAUSE button.
5	6	00	00	After setting the data, press the PAUSE button. (End)

4-4. OVERALL SIGNAL LEVEL AND DISTORTION CHECK

Purpose: Checks distortion level.

Mode	CAM-REC and playback
Signal	400 Hz, -38 dBs:
Measurement Point	AUDIO output terminal
Measuring Instrument	Audio level meter and distortion meter
Specification Value	Level: $-7.5 \pm 2.0$ dBs Distortion 0.8% or less (Note)

Note: The value when band-pass filter of 200 Hz to 6 kHz is used.



Check procedure:

Order	Procedure
1	Input 400 Hz, -38 dBs signal to, CN501 pin ④.
2	Record the signal. (CAM-REC)
3	Remove the input signal and playback the recorded segment.
4	Confirm that 400 Hz signal level at audio output terminal is $-7.5 \pm 2$ dBs and distortion is 0.8% or less. (Note)

4-5. OVERALL NOISE LEVEL CHECK

Purpose: Checks noise level.

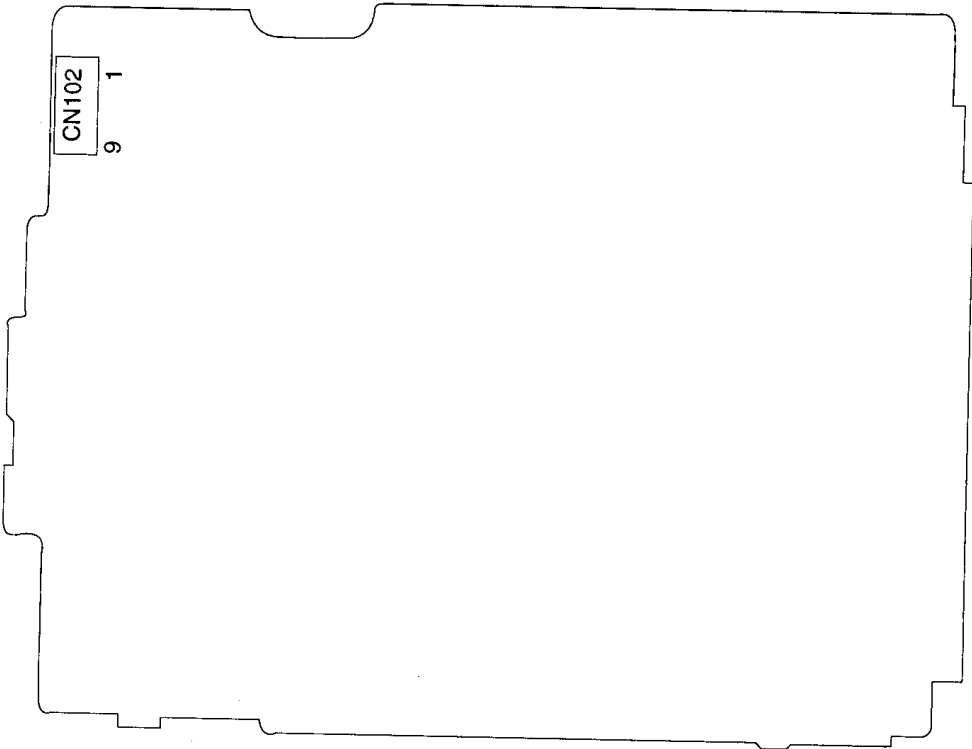
Mode	CAM-REC and playback
Signal	No signal: VC-167P board CN501 (Note)
Measurement Point	AUDIO output terminal
Measuring Instrument	Audio level meter (using IHF-A curve weighting filter)
Specification Value	- 65 dBs or less

Note: Before making short circuit between CN501 pins③ and ④, remove the flexible board from CN501

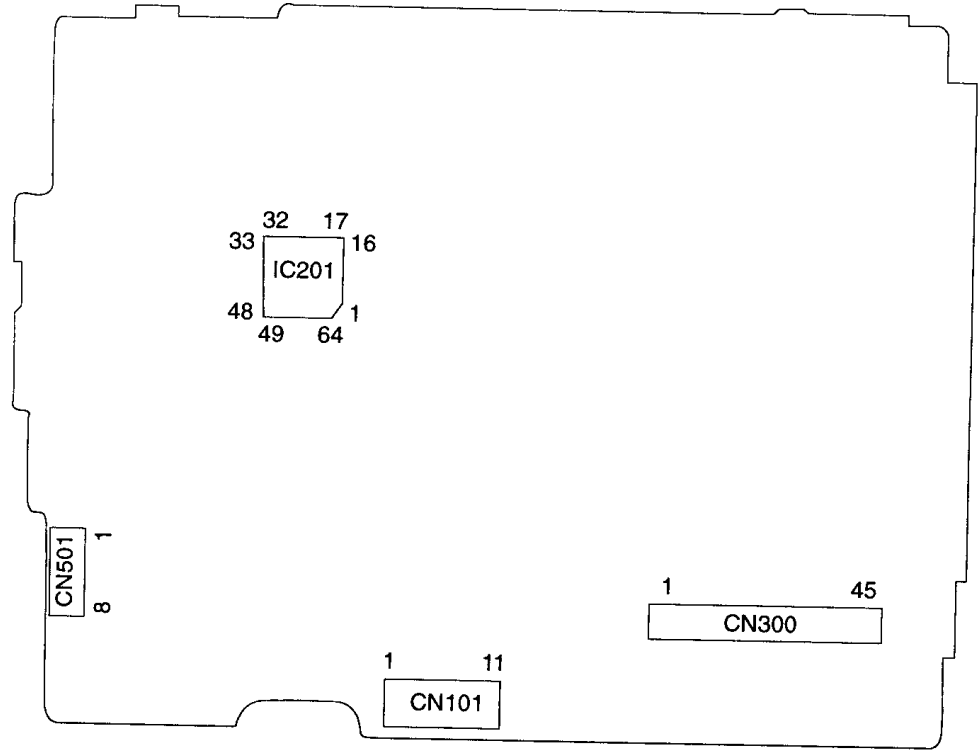
Check procedure:

Order	Procedure
1	Insert a shorting to pin③ and pin④ as CN501.
2	Make recording.
3	Remove the shorting plug.
4	Playback the recorded segment.
5	Confirm that the noise level at audio input terminal is - 65 dBs or less.

ARRANGEMENT DIAGRAM FOR ADJUSTMENT PARTS  
VC-167P BOARD (SIDE A)





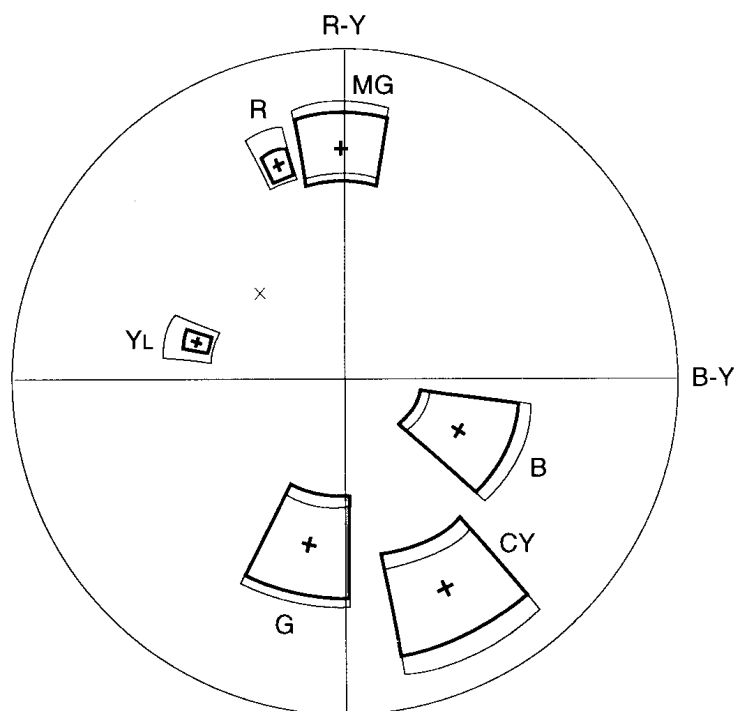
VC-167P BOARD (SIDE B)



# FOR CAMERA COLOR REPRODUCTION ADJUSTMENT (CCD-TR330E MODEL)

Take a copy of CAMERA  
COLOR REPRODUCTION  
FRAME and Parts reference  
sheets with a clear sheet for use.

 : WEIGHT OFF MODE  
 : WEIGHT ON MODE



CCD-TR330E

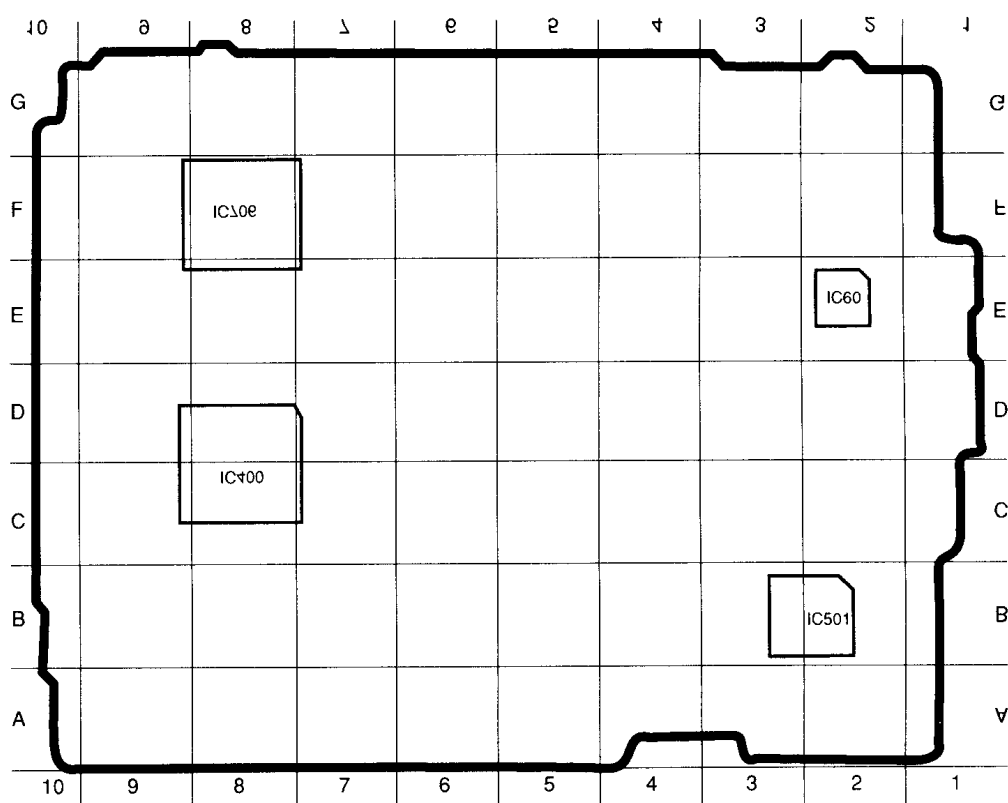


## 〈PARTS REFERENCE SHEET〉

You can find the parts position of mount locations applying to VC-167P board of a set

VC-167P CCD-TR330E

**SIDE A**



**SIDE B**

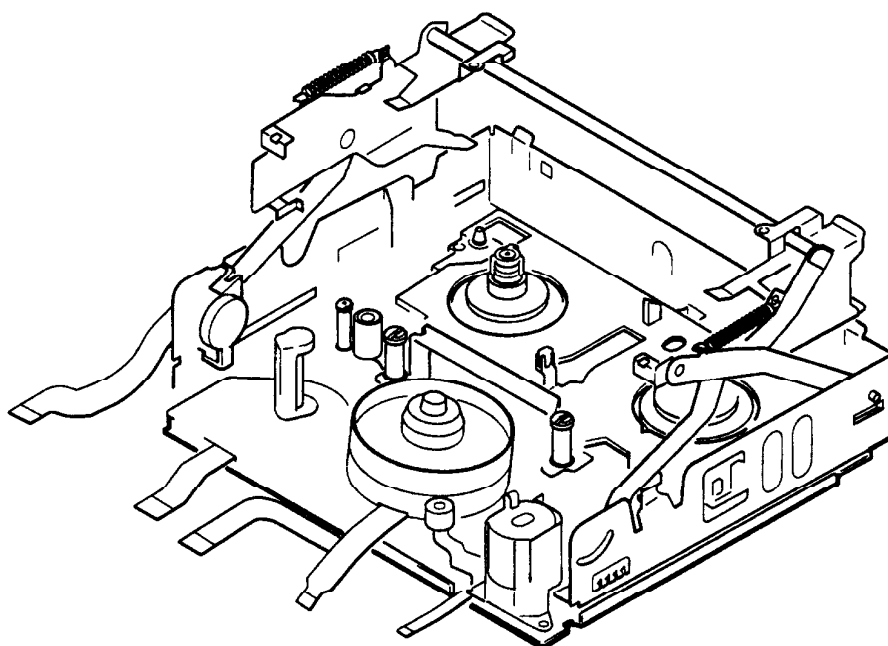
CCD-1B330E





**Video8**

# **B-mechanism know-how**



**8 MECHANISM DECK**

**SONY®**

# Contents

Table of B-mechanism know-how .....	6
<b>1</b> Tape not wound (Deformation of gooseneck retainer)-1 .....	12
Tape not wound (Deformation of gooseneck retainer)-2 .....	14
<b>2</b> Tape not wound (Inclination of TG4) .....	16
<b>3</b> No eject (Trouble with M slider at unloading) .....	18
<b>4</b> Video recording guide tape cassette not wound .....	19
<b>5</b> Trouble with guide base S at unloading .....	20
<b>6</b> Trouble with M slider at loading .....	21
<b>7</b> No unloading (Trouble with T ratchet) .....	22
<b>8</b> Tape not wound (Causing tape slack and T reel caution) .....	24
<b>9</b> Threading not completed (Change V-shaped drum base) .....	26
<b>10</b> Trouble with guide base S at loading .....	27
<b>11</b> No loading (Tape guide not moving out) .....	28
<b>12</b> Tape is not wound (Separation of LS guide roller) .....	29
<b>13</b> Trouble with EJ arm .....	30

<b>14</b>	Tape is not set in position and cannot be loaded ..... 31 (Trouble with pinch arm)
<b>15</b>	T soft brake not working, trouble with loading/unloading ..... 32 (Damage to T soft claw)
<b>16</b>	Trouble with M slider at loading ..... 33 (T soft brake torque becomes small)
<b>17</b>	"No cassette" displayed at cassette IN..... 34
<b>18</b>	Damage to tape due to slack of T side tape ..... 36 (Separation of T soft gear spring)
<b>19</b>	Tape not ejected (Capstan motor not rotating) ..... 38
<b>20</b>	Swinging of camera picture ..... 39
<b>21</b>	Separation of reel table magnet (Caution) ..... 40
<b>22</b>	Gooseneck gear not working..... 41
<b>23</b>	Separation of capstan motor flexible cable ..... 42
<b>24</b>	Tape wrinkle, tape damage ..... 43 (Trouble with capstan motor flexible cable)
<b>25</b>	Failure in loading/unloading operation due to deformation of LS arm pin ..... 44
<b>26</b>	V sync failure ..... 45

<b>27</b>	Noise in LP playback picture .....	46
<b>28</b>	Damage to FP249 flexible cable .....	47
<b>29</b>	Short-circuit between slits of loading motor.....	48
<b>30</b>	Deposit of foreign objects on capstan motor rotor.....	49
<b>31</b>	Separation of guide base .....	50
<b>32</b>	Break or wrinkle of tape.....	51
	(Due to incorrect adjustment of height of TG4)	

## Appendix TECHNICAL NEWS

### **PV-965018**

TAPE DAMEGE DUE TO DISCREPANCY IN TG-4 HEIGHT ADJUSTMENT .....	52
---	----

### **PV-985003**

Remedial measures when the trouble "T Reel Does Not Takes Up Tape" occurs (T reel caution) .....	54
---	----

### **PV-985045**

Unification of Improvements "T. Reel Height Change" for the Trouble of Reel Does Not Wind Tape .....	56
---	----

### **PV-975028**

Specification change of B mechanism reel table torque .....	57
---	----

### **PV-975031**

Remedy when grease is attached to tape .....	58
--	----

# Table of B-mechanism know-how

	Trouble	Symptom	Cause	Remedy	Page description
1	Tape not wound. (Deformation of gooseneck retainer.)	T-reel is pressed by deformation of gooseneck retainer.	Gooseneck retainer was deformed due to change in environment.	Replace with new part. Former part 3-965-584-01 ↓ New part Gooseneck retainer (2) 3-989-479-01	P.12 - P.15
2	Tape not wound. (Inclination of TG4)	TG4 arm was inclined, causing loading/unloading failure tape jamming, etc.	TG4 arm was inclined when user removed jammed tape and it was caught in TG4.	Replace with TG4 arm made of high-strength material (SUS). TG4 arm ass'y A-7040-417-A	P.16, P17
3	No eject. (Trouble with M slider at unloading.)	The edge at the end of M slider is caught in the caulked guide arm S.	The face "c" of the edge at the end of M slider is small.	Replace M slider. • Repair M slider.	P.18
4	Video recording guide tape not wound.	Tape is not wound in FWD mode. (This trouble occurs in video recording guide tape.)	<ul style="list-style-type: none"> <li>• Flatness of video recording guide tape cassette is NG.</li> <li>• The height of reel is low at cassette DOWN.</li> </ul>	<ul style="list-style-type: none"> <li>• Video recording guide tape is defective.</li> <li>• Replace video recording guide tape. (Improved tape is available from our stock.)</li> <li>• Check to see if the chassis is deformed or T reel shaft is tilted.</li> </ul>	P.19
5	Trouble with guide base S at unloading.	The V-shaped guide base is caught in the corner of drum base at unloading.	Insufficient margin.	<ul style="list-style-type: none"> <li>• Replace guide base S ass'y.</li> <li>• Replace drum base ass'y.</li> <li>• Repair the corner of drum base.</li> <li>• Change the V-shaped guide base to straight type.</li> </ul>	P.20
6	Trouble with M slider at loading.	The corner of M slider is caught in the hole of LS chassis at loading.	Inclination of M slider due to MD frame dab getting on the slider.	Replace M slider ass'y. • Change the shape of the corner of M slider.	P.21
7	No unloading. (Trouble with T ratchet)	T ratchet pin rides over M slider and is not reset, causing failure in operation of T latchet and generating unusual noise.	T ratchet was tilted and pin was loosened due to clearance between T ratchet shaft and the hole of LS chassis.	Replace with new part. (T ratchet) Former part 3-965-581-01 ↓ New part 3-965-581-03	P.22
8	Tape not wound. (Tape slack, T reel caution)	Tape is not wound on T reel, causing caution and tape jamming.	<ul style="list-style-type: none"> <li>• Gooseneck retainer interferes with T reel base due to deformation of gooseneck retainer.</li> <li>• Increase in loss torque of T reel base and reel shaft.</li> <li>• Insufficient margin of T reel height.</li> </ul>	Introduction of gooseneck retainer (2) (Prevention of interference with T reel.) (Improved gooseneck retainer) Hole diameter on T reel side has been made larger. Gooseneck retainer (2) 3-989-479-01	P.24, P25
9	Threading is not completed.	The tip of guide base T touches the entrance corner of V-shaped drum base, and threading is not completed.	Drum base touches guide base T.	Replace drum base ass'y.	P.26

Index	Trouble	Cause	Check	Remedy	Page
10	Trouble with guide base S at loading.	The tip of guide base is caught in the rib of drum base at loading, causing loading failure.	Insufficient margin.	<ul style="list-style-type: none"> <li>• Replace guide base S ass'y.</li> <li>• Replace drum base ass'y.</li> <li>• Change the shape of tip of guide base.</li> <li>• Use additional drum base rib.</li> </ul>	P.27
11	No loading (Tape guide not moving out)	Stopper is not released and guide does not move out at loading.	Insufficient amount of stopper release. (Small design margin)	Replace drum base ass'y. <ul style="list-style-type: none"> <li>• Change the size of stopper release unit of drum base to increase the amount of release.</li> </ul>	P.28
12	Tape not wound. (Separation of LS guide roller)	Tape is not wound due to failure of loading/unloading operation or floating of cassette by separation of LS guide roller.	The size of the step of inside diameter of LS guide roller is not correct.	Replace LS guide roller. (New part is available from our stock.) <ul style="list-style-type: none"> <li>• Repair LS guide roller.</li> </ul> (NOTE) Do not use the dismantled roller	P.29
13	Trouble with EJ arm.	C-IN (C.C. LOCK) SW is ON at all times due to deformation of EJ arm spring.	—	Replace EJ arm. <ul style="list-style-type: none"> <li>• Change the shape of EJ arm. (Cut the boss being caught in LS chassis.)</li> </ul>	P.30
14	Tape is not set in position and cannot be loaded. (Trouble with pinch arm)	The tip of pinch arm gets over the wall of guide base and is not operating.	Insufficient margin of pinch arm and the height of guide base wall.	Replace with improved part. Former part    A-7040-418-A ↓ New part        A-7040-418-B	P.31
15	T soft brake not working, trouble with loading/unloading. (Damage to T soft pawl)	The shaft at tip of T soft claw was caught in the bent portion of M slider and the pawl was damaged.	Insufficient margin for variations of bending position of M slider.	Replace M slider. <ul style="list-style-type: none"> <li>• Correct the bending position of M slider.</li> </ul>	P.32
16	Trouble with M slider at loading. (Small torque of T soft brake)	The tip of T soft claw interferes with the corner outside M slider.	Insufficient margin of T soft claw and the height of M slider.	Replace M slider. <ul style="list-style-type: none"> <li>• Repair the shape of M slider.</li> </ul>	P.33
17	"No cassette" displayed at cassette IN.	C-IN (C.C. LOCK) SW is sometime OFF during operation due to stress.	SW ON point specification differs from MD standards.	Replace part    1-572-680-11	P.34
18	Damage to tape due to slack in T side tape. (Separation of T soft gear spring)	Spring was separated in the market due to improper fit of spring hook.	Spring hook on LS chassis is in the shape of causing improper fit.	Mount the spring hook correctly. <ul style="list-style-type: none"> <li>• Use spring push-in jig.</li> <li>• Change the shape of spring hook on LS chassis to prevent improper fit.</li> </ul>	P.36, P.37
19	Tape not ejected. (Capstan motor not rotating)	Damage to driver due to over-current.	Damage due to over-current	Replace capstan motor.	P.38

	Trouble	Symptom	Cause	Remedy	Detail description
20	Swinging of camera picture	Camera picture swings during drum rotation. * This can be easily checked in ZOOM mode.	Shaft earth vibration interferes with the oscillation frequency of angular velocity sensor, causing failure in operation of steady shot prevention.	<ul style="list-style-type: none"> <li>• Apply grease on shaft earth contact.</li> <li>• Replace shaft earth with improved part. Former part 3-965-525-01 ↓ Now part 3 065 525 03</li> </ul>	P.39
21	Separation of reel table magnet. (Caution)	Pressure of reel table magnet seat is insufficient, causing separation of the magnet and resulting in caution.	Insufficient pressure by jig.	Replace reel table. <ul style="list-style-type: none"> <li>• Reel table in our stock has no problems.</li> </ul>	P.40
22	Gooseneck gear not working.	Gooseneck gear is caught between LS chassis and gooseneck retainer, causing failure in operation of gooseneck gear.	Insufficient margin of the thickness of gooseneck gear for the warp of gooseneck retainer and the clearance between LS chassis and gooseneck retainer.	Replace gooseneck gear ass'y. <ul style="list-style-type: none"> <li>• Change the thickness of gooseneck gear from 1.95 to 1.80.</li> </ul>	P.41
23	Separation of capstan motor flexible cable.	Capstan motor flexible cable is floating and touches rotor, causing unusual noise and incorrect rotation (jitter, no tape winding, etc.).	Decrease in adhesive force of flexible cable due to contamination of capstan stator with oil.	Rubber spacer Part Code 3-987-953-02 <ul style="list-style-type: none"> <li>• Clean with alcohol.</li> <li>• Attach rubber spacer to capstan motor to prevent it from floating.</li> </ul>	P.42
24	Tape wrinkle, tape damage. (Trouble with capstan motor flexible cable)	Flexible cable fitted between its holder and capstan stator comes off the position, causing change in capstan azimuth and tape jamming due to damage to capstan shaft.	The folded portion of capstan motor is caught at the time of assembling flexible cable retainer.	<ul style="list-style-type: none"> <li>• Repair to prevent flexible cable from being caught.</li> <li>• Change the shape of the holder of flexible cable to eliminate overlap of flexible cable retainer and capstan motor flexible cable.</li> </ul>	P.43
25	Failure in loading/unloading operation due to inclination of LS arm.	LS arm pin is bent due to dropping.	Strength of the root of pin is insufficient for dropping.	Replace with part. 3-965-532-21	P.44
26	V sync failure	Entrance contact of head projection is small, causing V sync failure.	Amount of head projection is small.	Replace drum ass'y. <ul style="list-style-type: none"> <li>• Change the amount of head projection.</li> </ul>	P.45
27	Noise in LP playback picture	Small output from one CH due to difference in output from CH1/CH2.	Clearance between drum shaft and bearing is large, causing the bearing to be out of position. (Difference in height of CH1/CH2 head)	Replace drum ass'y. <ul style="list-style-type: none"> <li>• Change shaft and bearing, from insertion type to press-in type.</li> </ul>	P.46
28	Damage to FP249 flexible cable	FP249 flexible cable is damaged, causing tape caution and failure of cassette IN SW ON.	Flexible cable was damaged by lock plate due to over stroke when cassette compartment is locked.	<ul style="list-style-type: none"> <li>• Increase the adhesive strength of flexible cable.</li> <li>* Prevention of corner from floating.</li> <li>• Change the arrangement of flexible cable pattern. (Keep lock plate away from pattern)</li> <li>• Change the shape of tip of lock plate.</li> <li>• Replace LS chassis (S1) ass'y. A7040-427-A</li> <li>• Replace cassette compartment ass'y. X-3945-400-1</li> </ul>	P.47



	Trouble	Symptoms	Cause	Remedy	Detail description
29	Short-circuit between slits of loading motor.	Loading motor is not rotating. (Blown SET fuse)	Short-circuit between slits by metallic powder from worn commutator.	Replace part. (Replace loading motor)	P.48
30	Deposit of foreign objects on capstan motor rotor.	Foreign objects entered between CAP rotor and MR element, causing failure of running or runaway (caution) due to damage to MR element.	Entry of foreign objects into capstan rotor.	Clean capstan motor and MR element. • When MR element is damaged, replace it together with capstan motor.	P.49
31	Separation of guide base.	Guide arm is loosened from stopper at EJECT and guide is separated from guide arm.	Stopper was deformed at the time of assembling.	• Add a dowel to the S side stopper so that it can be forcibly positioned. • Replace part. (Stopper S)	P.50
32	Tape wrinkle. (Due to incorrect adjustment of height of TG4)	Tape is wrinkled at the time of reverse mode (from PB mode to REV mode).	Tape is loosened near TG4, causing irregular tape travel or change in tape height when tape stops travel.	• Adjust tape path. • Replace TG4 arm ass'y.	P.51 - P.53
33	Tape is not wound. (T reel caution)	Tape is not wound on T reel due to caution of T reel	1. FWD torque is small. 2. Gooseneck retainer is warped. 3. Height of T reel base is low.	1. If FWD torque (T side in PB mode) is below 5g·cm, apply oil to T reel shaft. 2. If T reel table is damaged, gooseneck retainer may be warped and need to be replaced. 3. If tape is not wound T reel for any reason other than 1 and 2 above, replace T reel table. (The last figure of Part No. is "-3")	P.54 - P.56
34	Change in B mechanism reel table torque. (Tape stops during tape travel)	Check reel torque measuring method.	Check of FWD (PB mode) torque is not required on B mechanism, though it is checked at some service stations. Other mechanisms (A mechanism, etc.) were checked in the past.	(T side torque) • RVS brake torque 7-14g·cm • FWD (PB mode) torque need not be checked.  (S side torque) • REV takeup torque 17 - 35g·cm • FWD (PB mode) torque 8 - 10.5g·cm	P.57
35	Remedy when grease is attached to tape. (Drum not rotating, Picture NG)	Drum is not rotating and picture is NG due to deposit of MD grease on drum and tape.	Grease on MD spreads over drum base and deposits on drum through tape.	Change grease to non-spread type. Alcohol is normally used for cleaning at service stations.  Former grease      SG-055G, 7-651-000-09 ↓ New grease              SG-941, 7-662-001-39	P.58, P.59

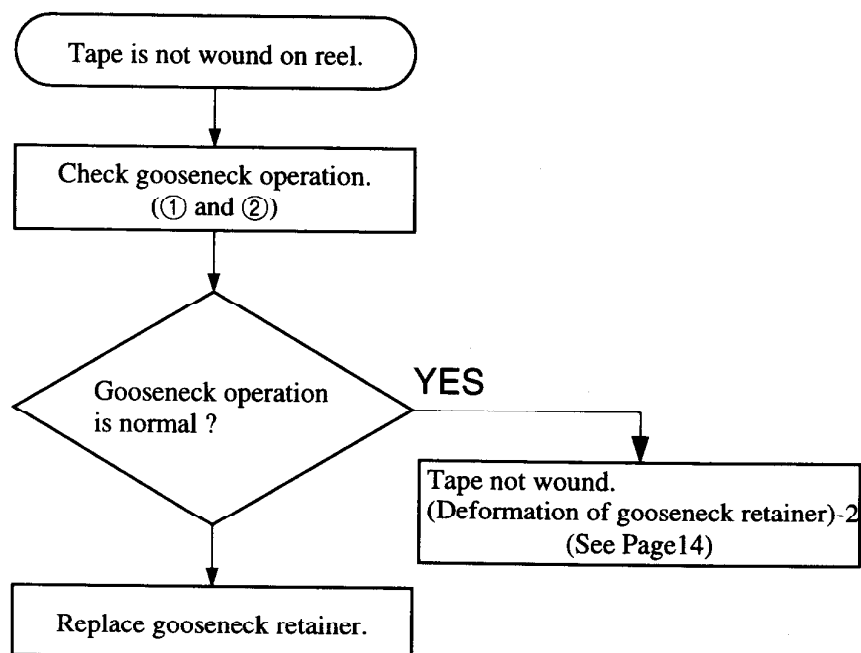
Item No.	Trouble	Symptom	Cause	Remedy	Detail description
36	Reel caution.	Reel is rotating but reel rotation cannot be detected due to caution.	Reel sensor is defective.	Replace LS chassis (S1) ass'y.	—
37	Tape is caught at loading.	Burrs on the side of drum base stopper release interferes with the stopper, causing loading failure and unusual noise.	—	Replace drum base ass'y. • Change the width of stopper release.	—
38	Caution (Failure of reset of reel table claw.)	Reel pawl is not reset at the time of cassette DOWN, causing damage to the reel due to idle rotation.	The size of reel table dowel is NG.	Replace reel table. • Repair reel base dowel.	—
39	Damper is separated.	Damper gets off the position, causing cassette compartment to move up quickly. Entry of foreign objects in the damper has also caused incorrect operation.	<ul style="list-style-type: none"> <li>● Pawl was not hooked correctly at the time of mounting the damper.</li> <li>● Damper is pressed and separated when cassette compartment lid is mounted.</li> </ul>	Mount the damper correctly.	—

**1****Tape not wound (Deformation of gooseneck retainer)-1****(Symptom)**

- A.** Gooseneck gear ass'y is not operating due to deformation of gooseneck retainer. Tape is not wound on reel table.

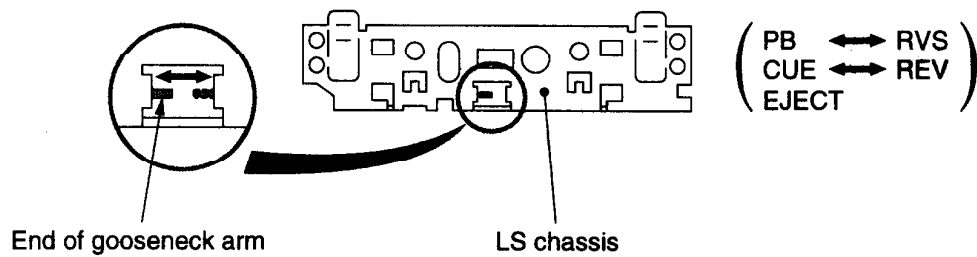
**(Cause)**

Gooseneck gear ass'y touches the gooseneck retainer due to warp of the retainer, so gooseneck gear does not operate properly and is not meshed with the gear of reel table.

**(Remedy)**

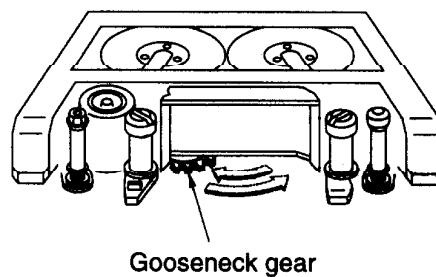
**Mounting screw No.2    3-976-055-01**  
**Gooseneck retainer (2)    3-989-479-01**

- ① When LS is completed, check the operation of gooseneck gear ass'y from the hole at front of LS chassis.



- When the end of gooseneck arm is at extreme left, it is meshed with T reel table.
- When the end of gooseneck arm is at extreme right, it is meshed with S reel table.

- ② Check the operation of gooseneck gear ass'y at the time of cassette IN.



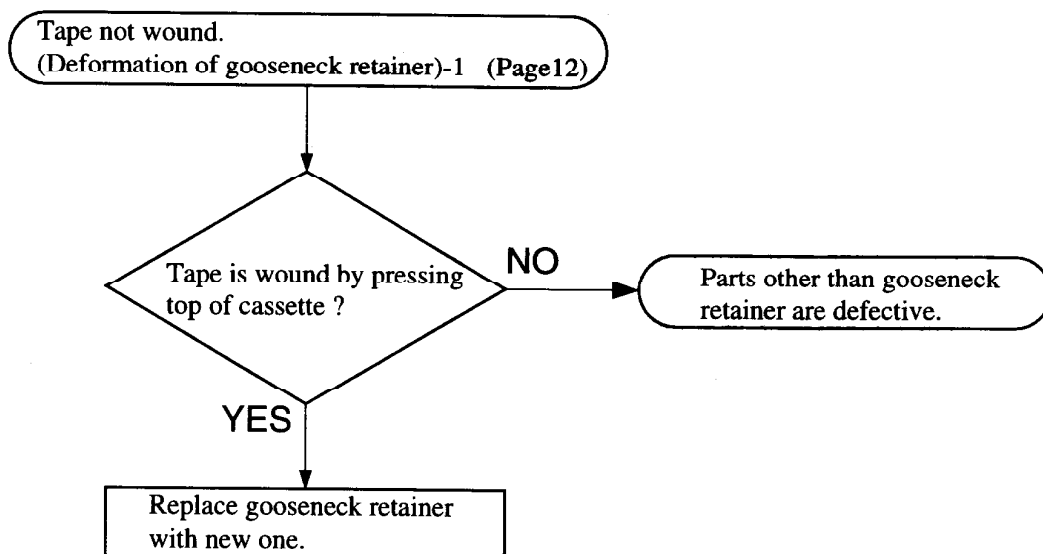
- Gooseneck gear moves momentarily toward T reel table at cassette IN to wind tape.
- Then, gooseneck gear moves toward S reel table to start loading.  
(Gooseneck gear stops moving before it reaches S reel table)

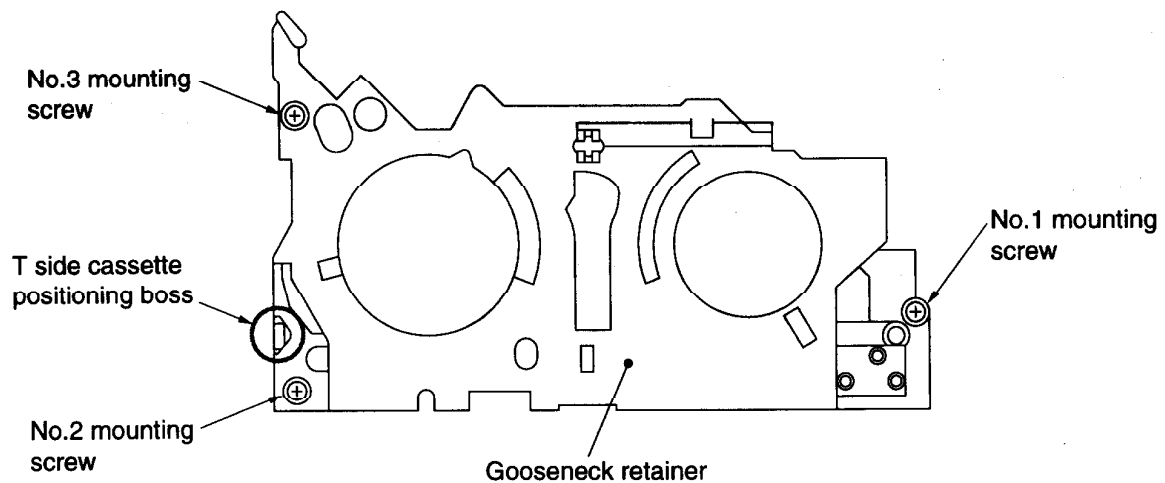
**1****Tape not wound (Deformation of gooseneck retainer)-2****(Symptom)**


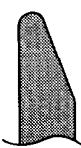

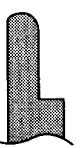
- B.** Gooseneck retainer is warped or deformed. Cassette is not set in place and tape is not wound on reel.

**(Cause)**

Gooseneck retainer is warped (center top) or deformed (inclination of T side cassette positioning boss (see diagram at page15)), so cassette is not set in place. Reel hub in cassette touches cassette shell and tape is not wound on reel.

**(Repair procedure)**



	Former parts		New parts
Part No.	3-965-584-01	➔	3-965-584-08
Shape of T side cassette positioning boss	 		 
No.2 mounting screw	3-947-503-01 M1.4 x 2.5	➔	3-976-055-04 Shoulder screw, M1.4 x 1

**2****Tape not wound (Inclination of TG4)**gobnuom E. old  
W0T02**(Symptom)**

TG4 is bent, causing tape jamming (irregular tape travel) and loading/unloading failure (TG4 shaft is inclined from the groove of mechanism chassis).

**(Cause)**

1. Cassette of jamming tape was removed forcibly when the tape was caught in TG4.
2. The set was dropped off during unloading operation, and TG4 was separated from the groove of mechanism chassis.
3. LS chassis was pushed forcibly at the time of tape top processing.

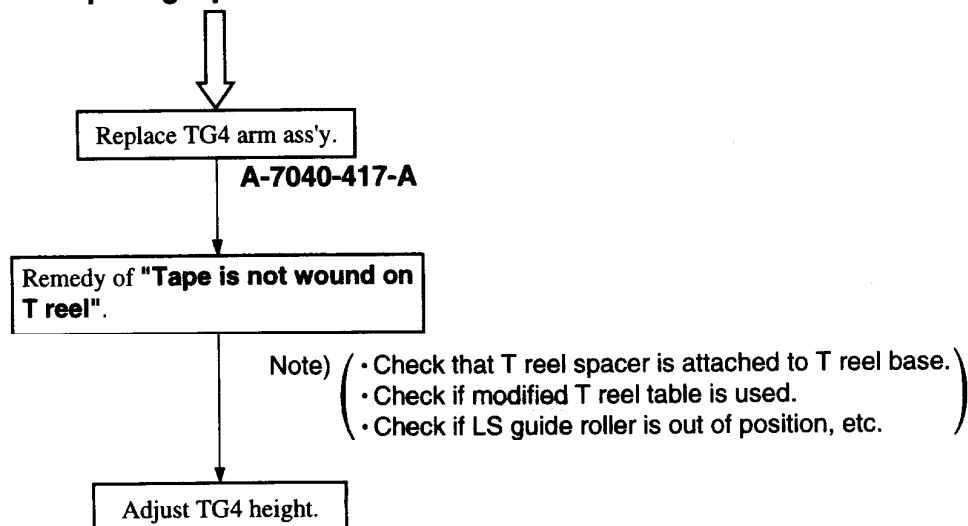
**(Remedy)**

Change the material of TG4 arm.

## (Repair procedure)

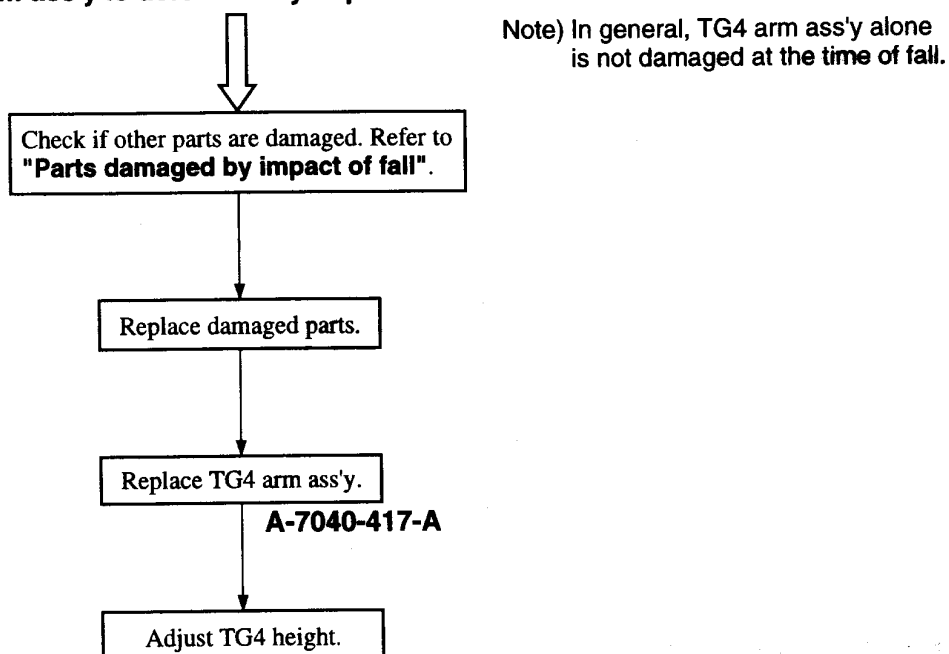
### A. Tape is not wound correctly, causing deformation when removing tape.

**Tape is not wound correctly and cannot be removed.  
Tape is entangled at TG4. TG4 arm ass'y is deformed  
by the force of pulling tape.**



### B. Deformation due to impact of fall.

**TG4 arm ass'y is deformed by impact of fall.**



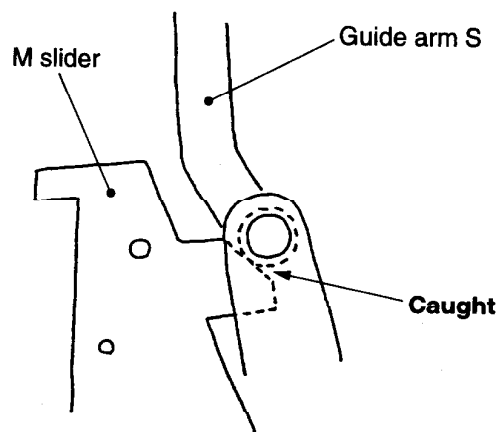


**3****No eject (Trouble with M slider at unloading)****(Symptom)**

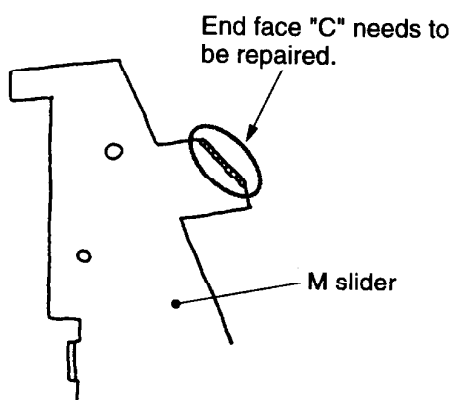
The caulked portion of guide arm S is caught in the edge on the end face of M slider, causing unloading failure.

**(Cause)**

The end face "C" of M slider is small and the caulked portion of guide arm S was caught in the end face.

**(Remedy)**

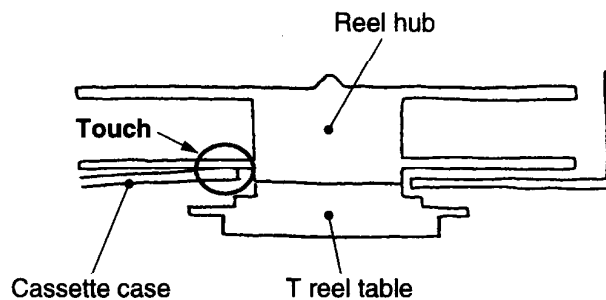
Repair M slider end face "C".

**(Repair procedure)**

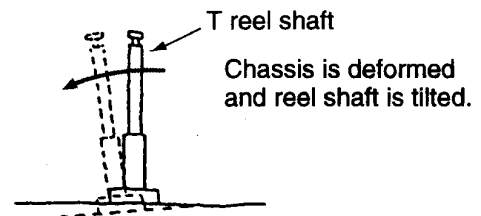
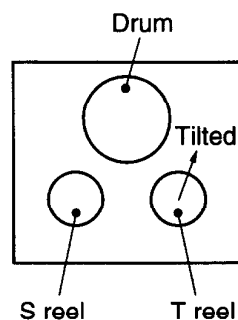
Replace M slider.

**(Symptom)**

Reel hub touches the bottom of the case of video recording guide tape cassette, and tape cannot be wound due to failure of reel rotation.

**(Cause)**

1. Flatness of video recording guide tape cassette is NG.
2. The height of T reel is low due to deformation of chassis at cassette compartment DOWN with the spring force of cassette compartment, causing a fall of T reel shaft.

**(Remedy)**

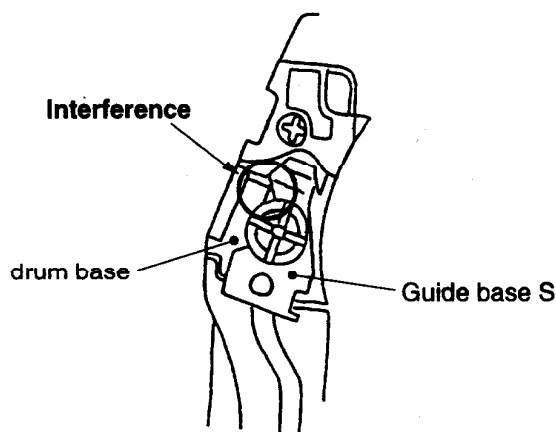
1. Change the verticality tolerance of T reel shaft.
2. Correct the flatness of video recording guide tape cassette.
3. Change the height of T reel (spacer can be used temporarily).

**(Repair procedure)**

- Replace video recording guide tape cassette.
- Check T reel shaft for bending.

### (Symptom)

The corner of drum base groove is caught in the V-shaped guide base S at unloading, causing unloading failure.

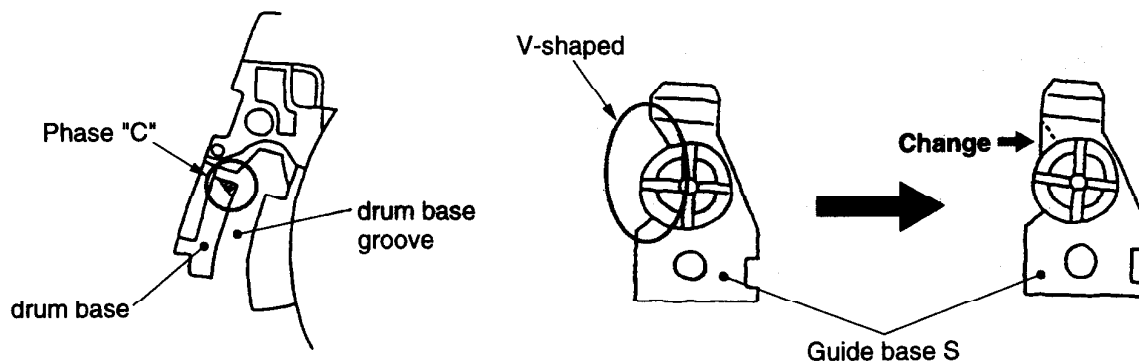


### (Cause)

Interference due to variations of the corner of drum base groove and the shape of edge of guide base S (insufficient margin).

### (Remedy)

1. Repair the corner "C" at entrance of drum base groove.
2. Change the V-shaped side of drum base to straight type.



### (Repair procedure)

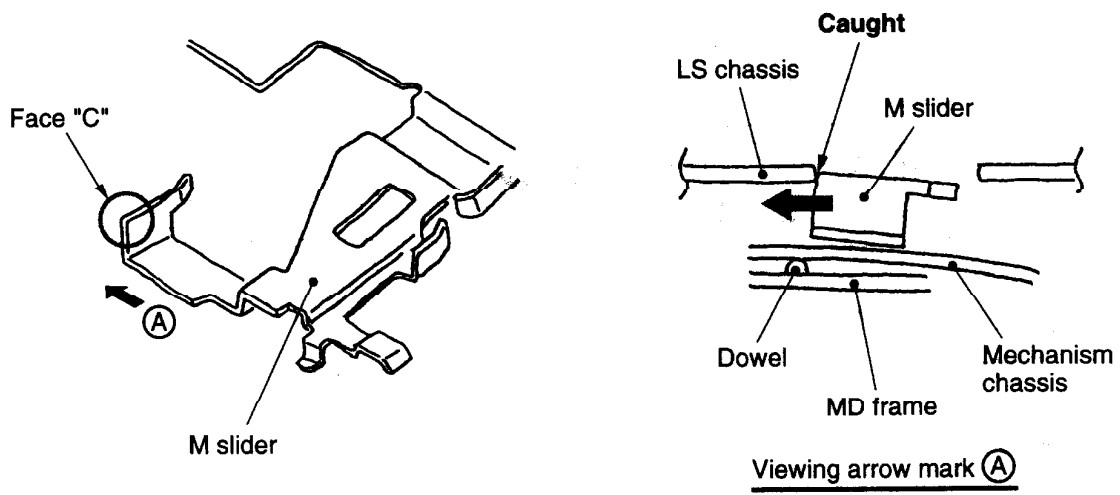
- Replace guide base S ass'y.
- Replace drum base ass'y.

### (Symptom)

The corner of M slider is caught in the hole of LS chassis, causing deformation of M slider and loading failure.

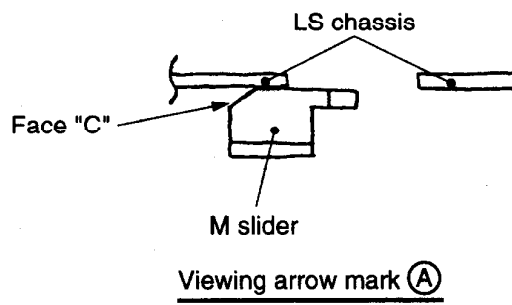
### (Cause)

MD frame was mounted when the dowel was floating. The posture of M slider was changed due to warp of mechanism chassis, and the corner of M slider entered the hole of LS chassis.



### (Remedy)

Repair the corner "C face" of M slider to prevent it from being caught.



### (Repair procedure)

Replace M slider ass'y.

# 7

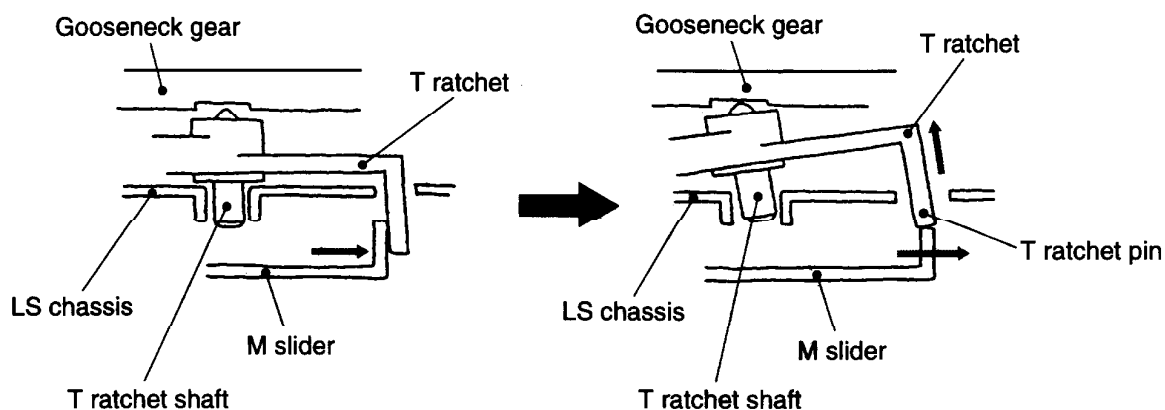
## No unloading (T ratchet is tilted and the M slider is tilted)

### (Symptom)

T ratchet pin rides over M slider and is caught at loading/unloading, causing failure of resetting T ratchet.

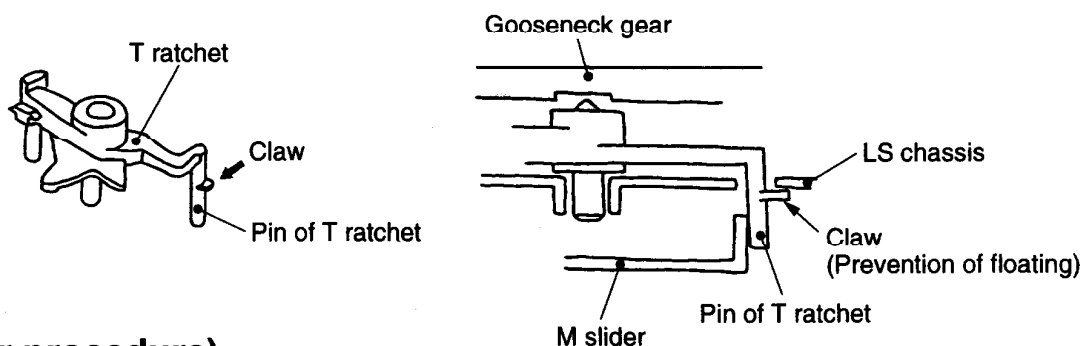
### (Cause)

T ratchet shaft is loosened in the hole of LS chassis, and M slider is pushed to M slider at change of mode, so T ratchet is tilted. The pin rides over the wall of M slider and cannot be reset.



### (Remedy)

1. Turn T reel with hand and check that it is meshed with reel table. (Factory check)
2. Pad the foot of T ratchet to prevent tilting.
3. Add a claw to the pin of T ratchet and hook on LS chassis to prevent T ratchet from floating.



### (Repair procedure)

Replace T ratchet.

(Former)  
3-965-581-01



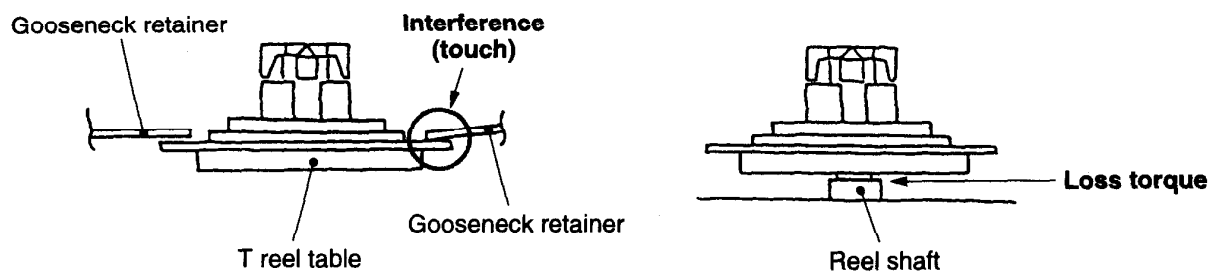
(New)  
3-965-581-03

**(Symptom)**

Tape is not wound on T reel at PB mode, causing tape slack and T reel caution.

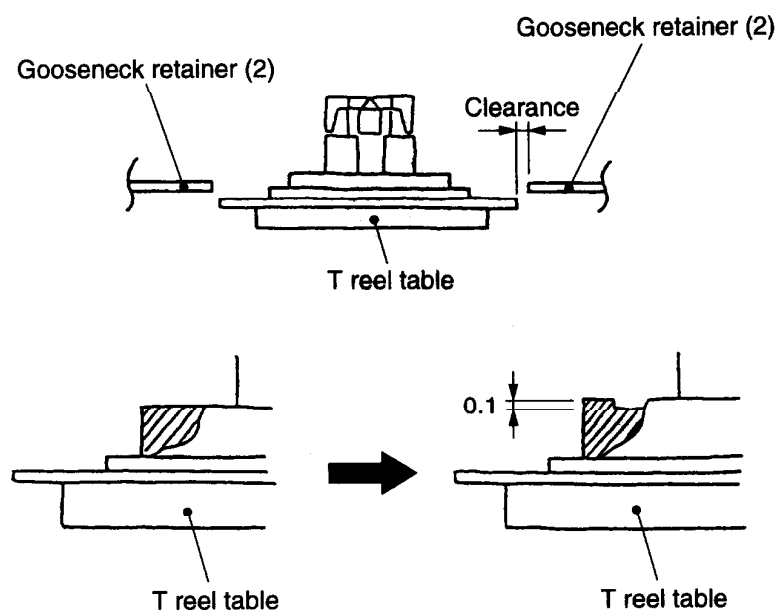
**(Cause)**

1. The outer surface of T reel touches gooseneck retainer due to deformation of gooseneck retainer (no clearance in the direction of height).
2. The margin of T reel height is insufficient (the height of reel table is low).
3. Loss torque between reel table and reel shaft is large, reducing FWD winding torque.



## (Remedy)

1. Change the size of T reel hole for gooseneck retainer (prevention of interference).  
Gooseneck retainer (2)
2. T reel table height +0.1 UP
3. Apply oil to reel shaft and change the material.
4. Check FWD winding torque.  
Former type ..... Without check and standards  
After change ..... FWD torque  $4g \cdot cm$  or more



## (Repair procedure)

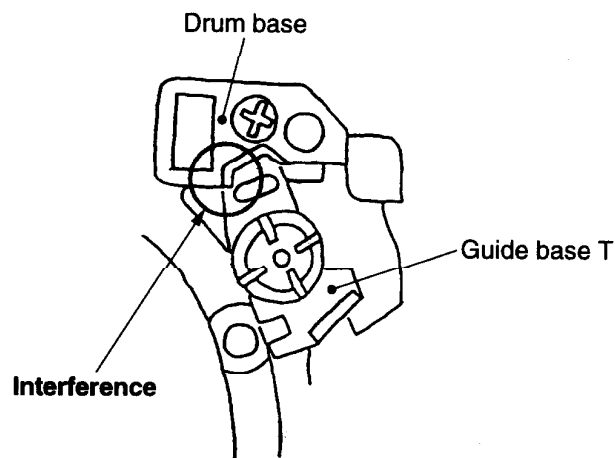
1. Move T reel up and down and check that it is not loosened (gooseneck retainer touches T reel table), and change gooseneck retainer with gooseneck retainer (2).
2. When winding torque is small (less than  $4g \cdot cm$ ), apply oil to T reel shaft.
3. If it is not corrected by 1 and 2, replace T reel table.
4. If it is not corrected by 1-4, replace LS chassis (reel shaft may be tilted).

**9****Threading not completed (Change V-shaped drum base)****(Symptom)**

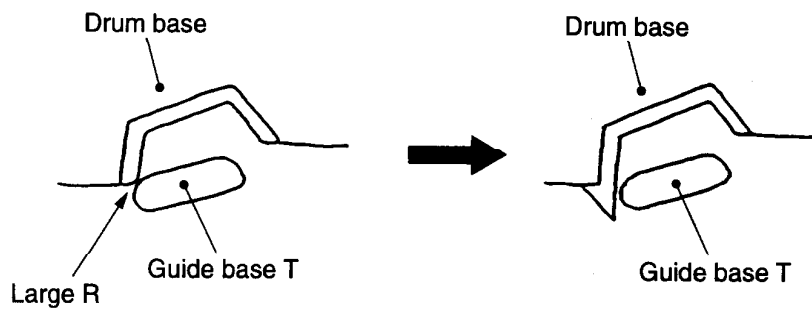
The drum base touches the guide base T at loading, causing failure of tape threading.

**(Cause)**

The drum base touches the guide base T at the position marked "O".

**(Remedy)**

Extend the V-shaped portion at the corner of V-shaped drum base.

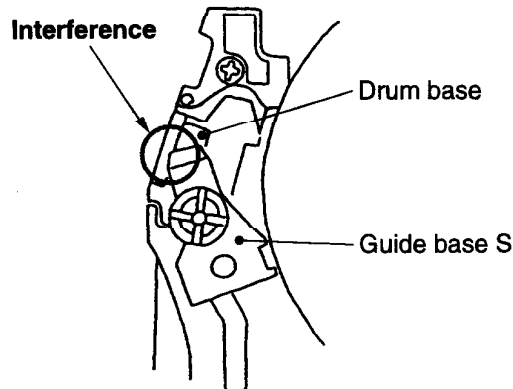
**(Repair procedure)**

Replace drum base ass'y.



**(Symptom)**

Tip of guide base S is caught in the triangle rib at the entrance of drum base, causing loading failure.

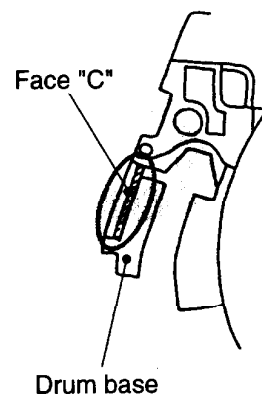
**(Cause)**

Tip of guide base S caused interference due to variations of position and thickness of drum base rib (insufficient margin).

**(Remedy)**

1. Add face "C" to the tip of guide base S.

Add face "C" to the entrance triangle rib of drum base.

**(Repair procedure)**

- Replace guide base S ass'y.
- Replace drum base ass'y.

**(Symptom)**

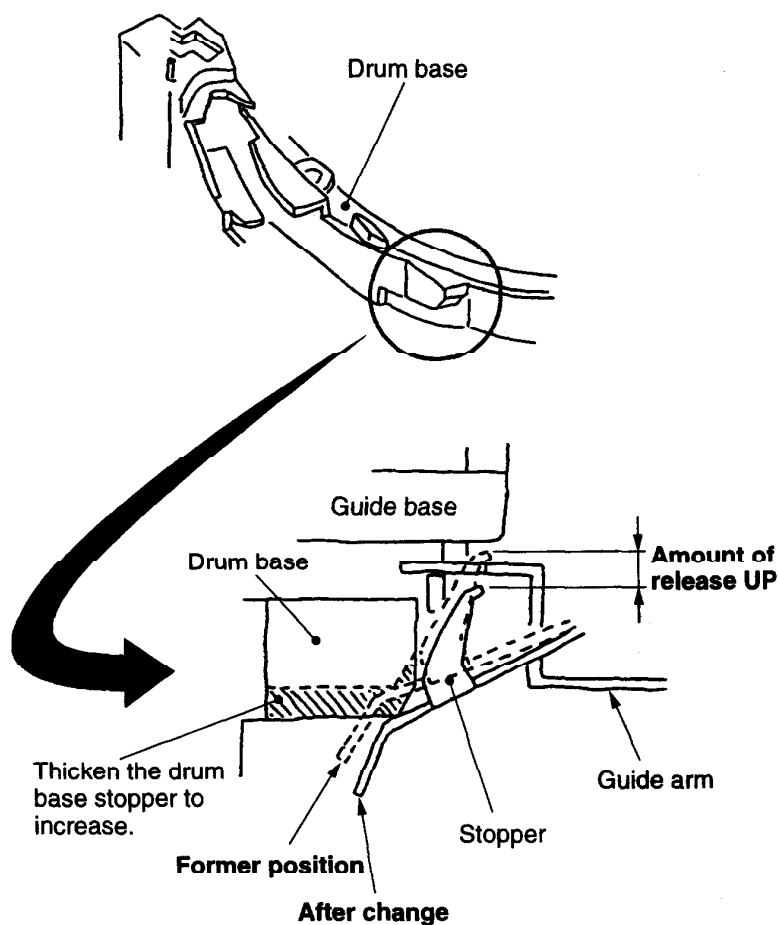
Stopper is not released at guide load, causing loading failure.

**(Cause)**

Drum base stopper opens at its release position, causing insufficient margin of releasing the claw from the hook of guide arm.

**(Remedy)**

Thicken the drum base stopper to increase the amount of releasing the stopper.

**(Repair procedure)**

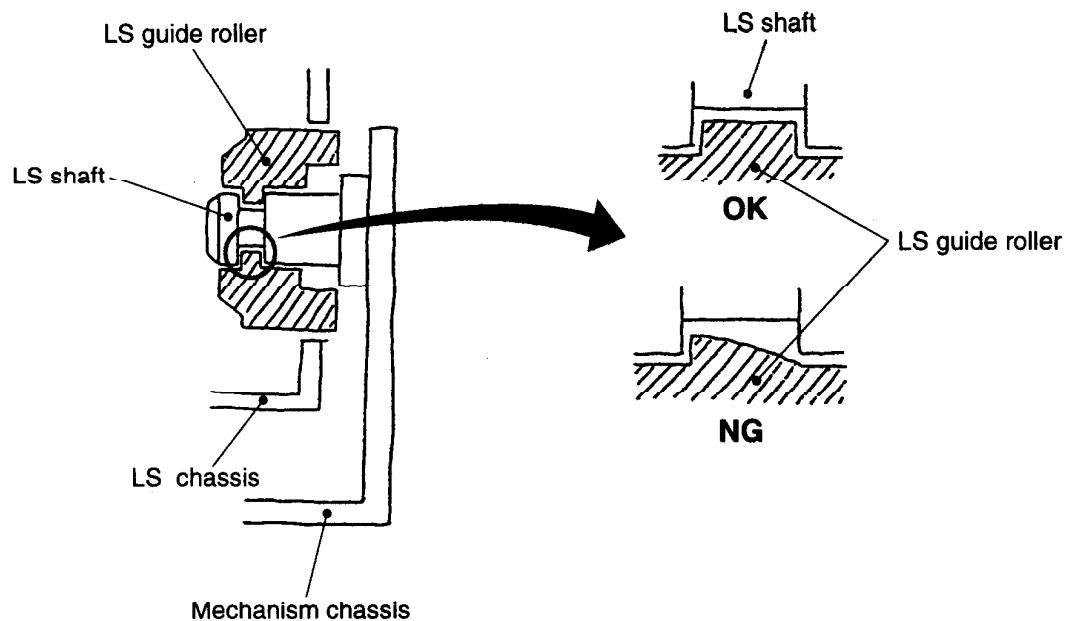
Replace drum base ass'y.

**(Symptom)**

LS guide roller is separated, causing loading /unloading failure. Tape is not wound on reel (cassette gets out of position).

**(Cause)**

Releasing force of LS guide roller is small due to improper shape of claw that is caught in the groove of LS shaft.

**(Remedy)**

Correct the shape of LS guide roller.

**(Repair procedure)**

- Replace LS guide roller.
- Do not use the dismounted roller.

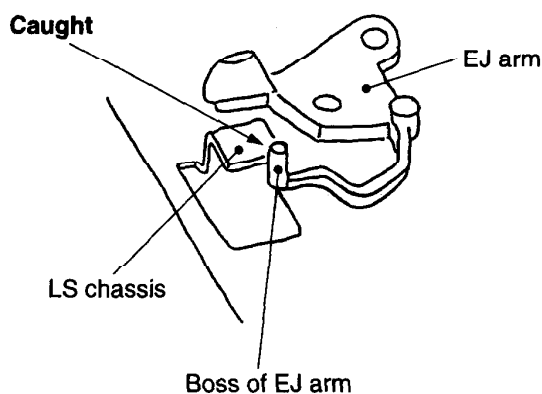
**13****Trouble (with Editing 2.1 to roll stage 3) button for 21 edit**

### (Symptom)

C-IN (C.C. LOCK) SW is always ON and tape is loaded in the state of cassette compartment UP.

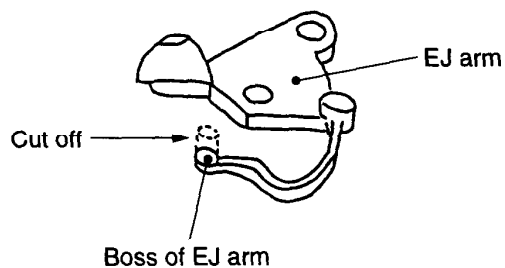
### (Cause)

EJ arm is deformed at the time of assembling and the boss on the spring is caught in LS chassis, and SW is kept pressed.



### (Remedy)

Cut off the boss that is caught in LS chassis of EJ arm.



### (Repair procedure)

Replace EJ arm.

14

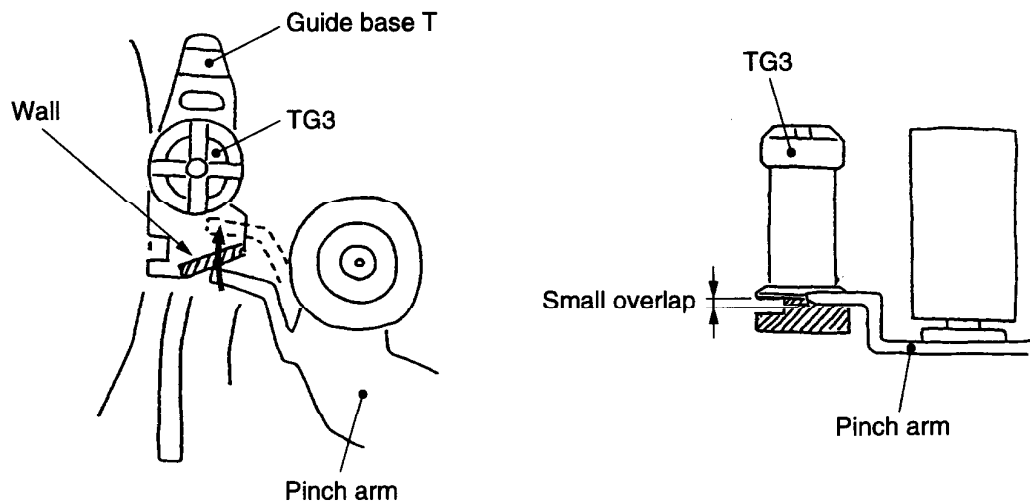
Tip of pinch arm gets over the wall of guide base T and enters between guide base T and TG3.  
(Trouble with pinch arm) (Note: Not T of guide base)

## (Symptom)

The tip of pinch arm gets over the wall of guide base and enters between guide base T and TG3, causing loading failure.

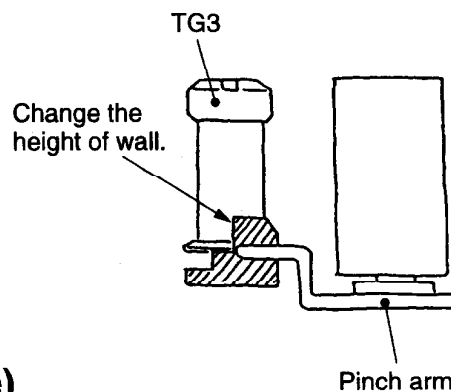
## (Cause)

The amount of overlap of the tip of pinch arm and the wall of guide base T is small.



## (Remedy)

Change the height of wall of guide base T to obtain margin to the tip of pinch arm.



## (Repair procedure)

Replace pinch arm with improved part.

(Former)  
A-7040-418-A



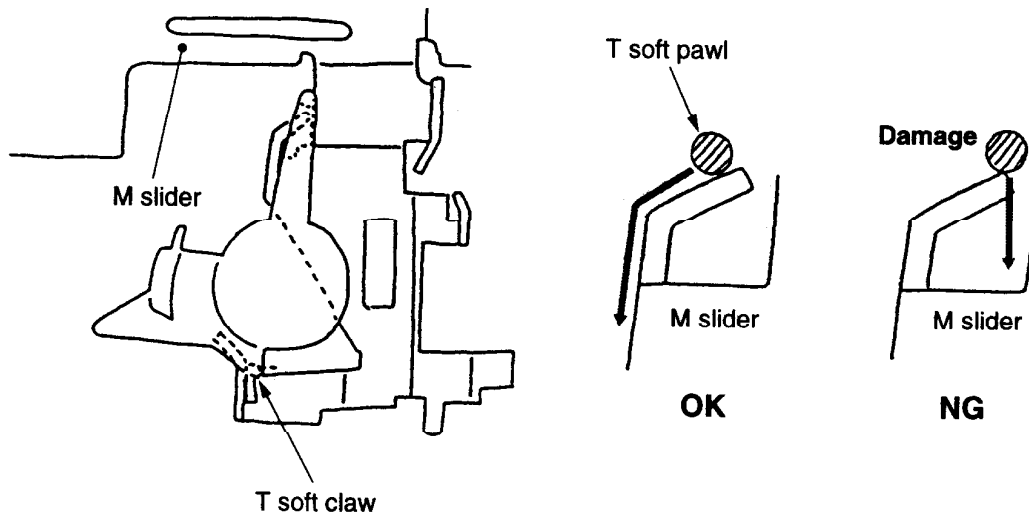
(New)  
A-7040-418-B

**15**

**T soft brake not working, trouble with loading/unloading  
(Damage to T soft claw) (mis-align M slider)**

### (Symptom)

The shaft at tip of T soft claw is caught in the bent portion of M slider and damaged at the time of unloading. T soft brake is not working or is caught at loading/unloading.

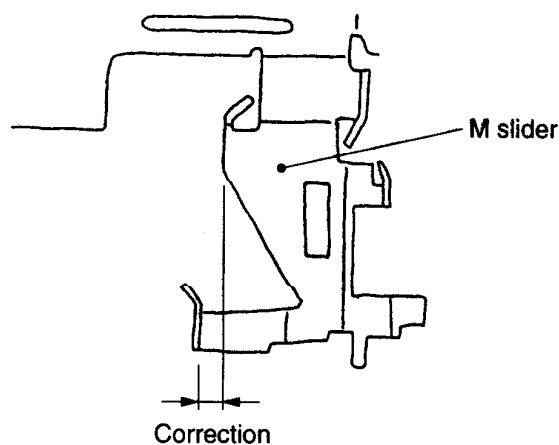


### (Cause)

Insufficient margin due to variation of the position of bent portion of M slider.

### (Remedy)

Correct the width of bent portion of M slider.



### (Repair procedure)

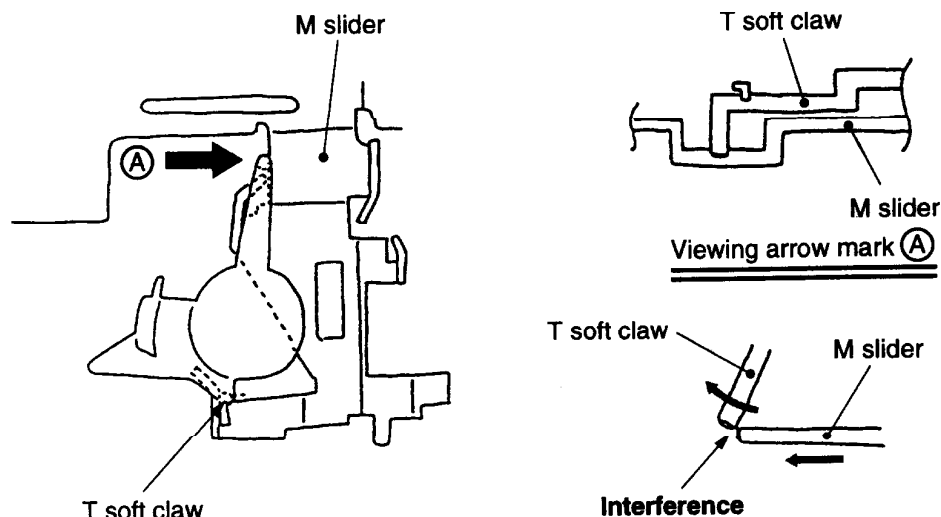
Replace M slider ass'y.

16

Problem with M slider and T soft claw  
(T soft brake torque becomes small)

## (Symptom)

The tip of T soft claw interferes with the corner of M slider at loading, and T soft brake torque (failure of T soft brake) becomes small.

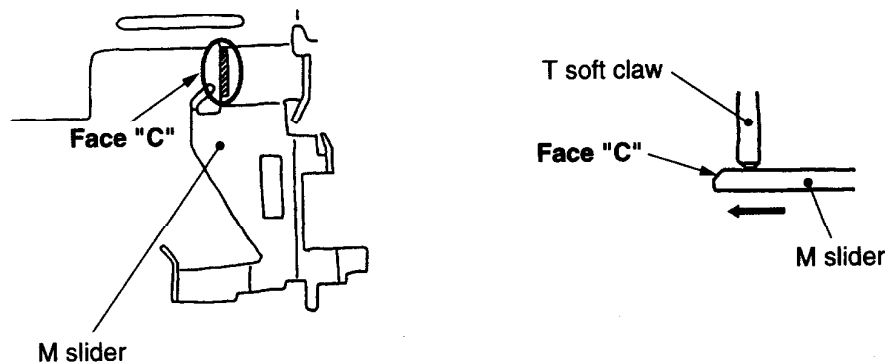


## (Cause)

Insufficient margin of clearance between the tip of T soft claw and M slider in the direction of height.

## (Remedy)

Add face "C" to the position that touches T soft claw of M slider.



## (Repair procedure)

Replace M slider.

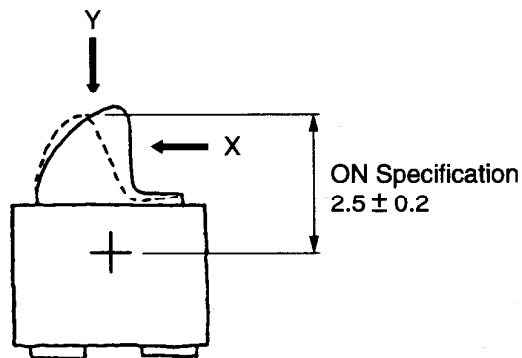
**17****"No cassette" displayed as cassette is in the slot****(Symptom)**

C-IN SW (C.C. LOCK) is not ON at cassette DOWN and "No cassette" is displayed.

**(Cause)**

Insufficient margin of stroke at ON point of C-IN SW

1. SW ON point specification differs from standards of using MD.
2. Clearance between SW lever dowel and case hole is large, causing improper fit.

**(Repair procedure)**

Replace SW with improved C.C. LOCK switch (1-572-680-11).



**18**

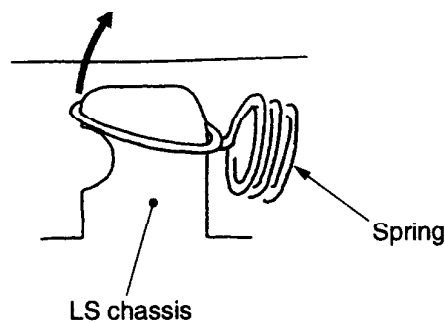
## **Damage to tape due to slack of T side tape (Separation of T soft gear spring)**

### **(Symptom)**

LS chassis spring is separated, causing incorrect operation (spring is caught by entry of foreign objects). Poor picture quality. (decrease in tension, etc.)

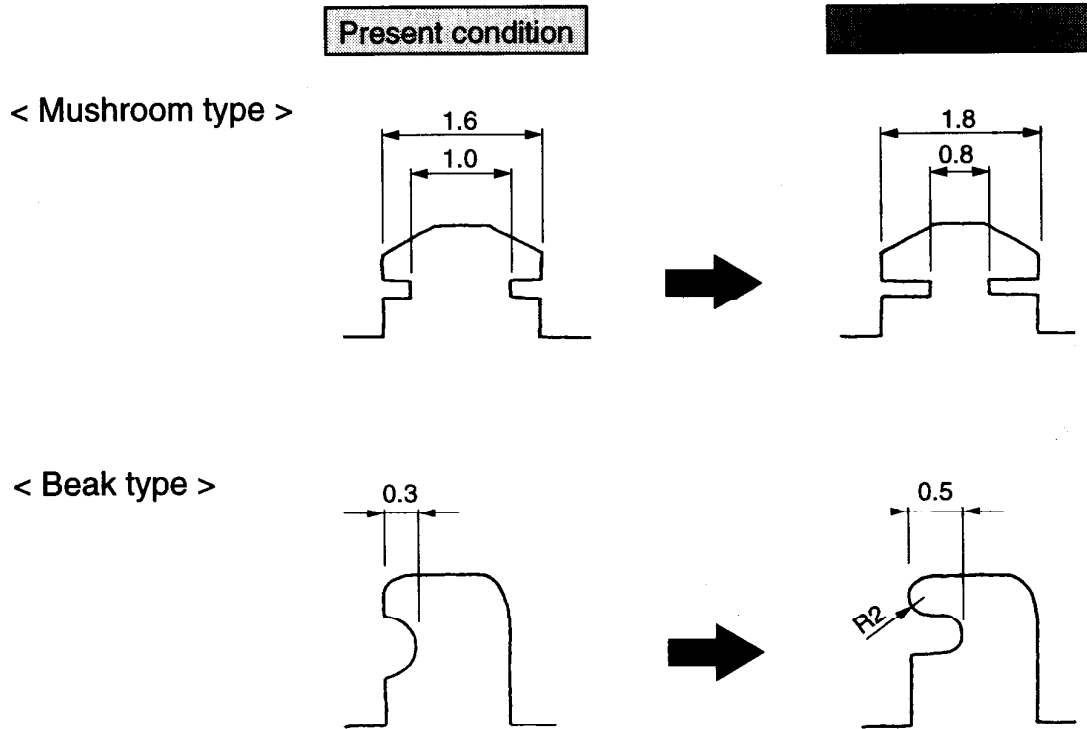
### **(Cause)**

1. Spring is separated due to failure of hooking the spring claw (improper assembling).
2. Spring is easily separated by a touch of spring claw due to incorrect phase of spring hook or small overlap between LS chassis spring claw and spring hook.



## (Remedy)

1. Push spring hooks with jig and check (prevention of hooking failure).
2. Change the shape of spring claw to increase overlap between spring claw and spring hook, and margin UP against separation of spring.



## (Repair procedure)

- Mount the spring hook correctly to prevent separation (repair).
- Improved parts are available from our stock.

**(Symptom)**

Capstan motor does not rotation due to damage to driver IC, causing loading failure at tape IN or EJECT failure.

**(Cause)**

- Damage due to over-current  
Short-circuit between terminals due to incorrect handling, short-circuit due to entry of foreign objects or slant insertion of flexible cable.

**(Repair procedure)**

- Remove foreign objects and check for slant insertion of flexible cable.
- Replace capstan motor, if driver IC is damaged.

**(Symptom)**

Camera picture swings at ON of steady shot compensation.

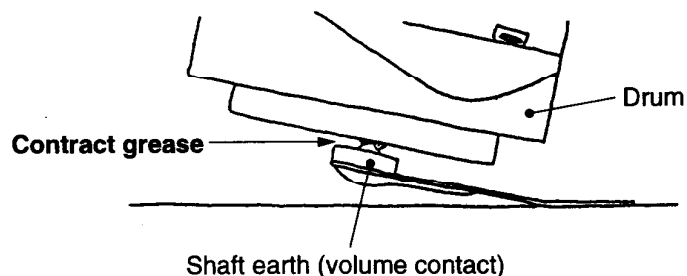
\* This can be easily checked in ZOOM mode.

**(Cause)**

Shaft earth vibration interferes with the oscillation frequency of angular velocity sensor during drum rotation, causing failure in operation of steady shot preventive sensor and swinging of camera picture at ON of steady shot compensation.

**(Repair procedure)**

1. Apply grease to the tip of the volume contact of shaft earth.



2. Replace shaft earth with improved part.

(Former)  
3-965-525-01



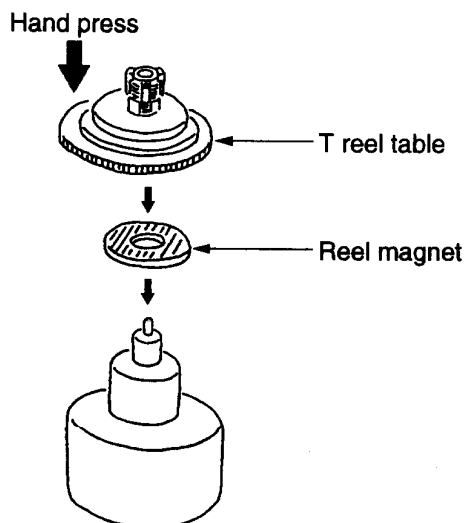
(New)  
3-965-525-03

**(Symptom)**

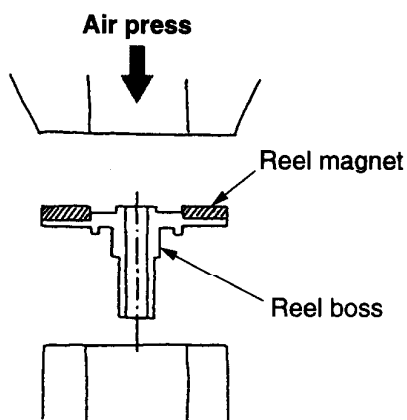
Adhesive force of S/T reel table rotation detect magnet seat is insufficient, causing separation of magnet and resulting in caution (reel table rotation cannot be detected) or rotation failure.

**(Cause)**

Magnet seat was stuck by a press of reel table boss with hand, causing variation in adhesive pressure and separation of reel table magnet.

**(Remedy)**

Use air press machine to obtain constant pressure on magnet seat for improvement.

**(Repair procedure)**

Replace reel table.

### (Symptom)

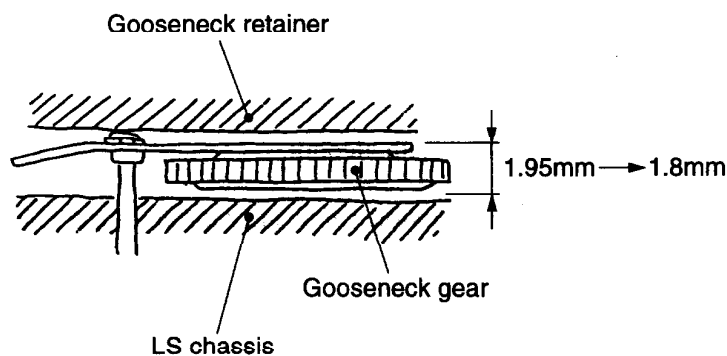
Gooseneck gear is caught between gooseneck retainer and LS chassis due to deformation of gooseneck retainer, causing failure in operation of gooseneck gear.

### (Cause)

Insufficient margin of clearance between gooseneck retainer and LS chassis, and the thickness of gooseneck gear.

### (Remedy)

1. Change the thickness of gooseneck gear, from 1.95 to 1.8mm.
2. Change the height of foot of gooseneck retainer + 0.05mm (from 2.20 to 2.05mm, clearance between foot and LS chassis is "0").



### (Repair procedure)

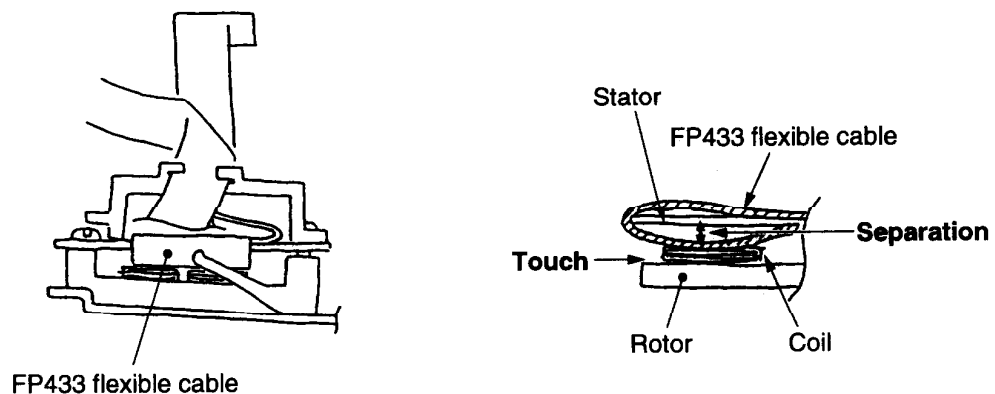
Replace gooseneck gear.

### (Symptom)

Coil mount of FP433 flexible cable of capstan motor is floating and the coil touches the rotor, causing unusual noise, incorrect rotation and swinging of picture.

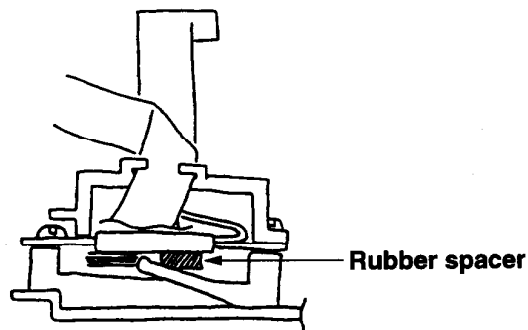
### (Cause)

Adhesive power of FP433 flexible cable is reduced due to oil which was left at the time of pressing the capstan motor to the stator.



### (Remedy)

1. Clean stator (driver IC side) with alcohol.
2. Add rubber spacer between flexible cable and capstan spacer (Mount side) to forcedly prevent the flexible cable from floating.



### (Repair procedure)

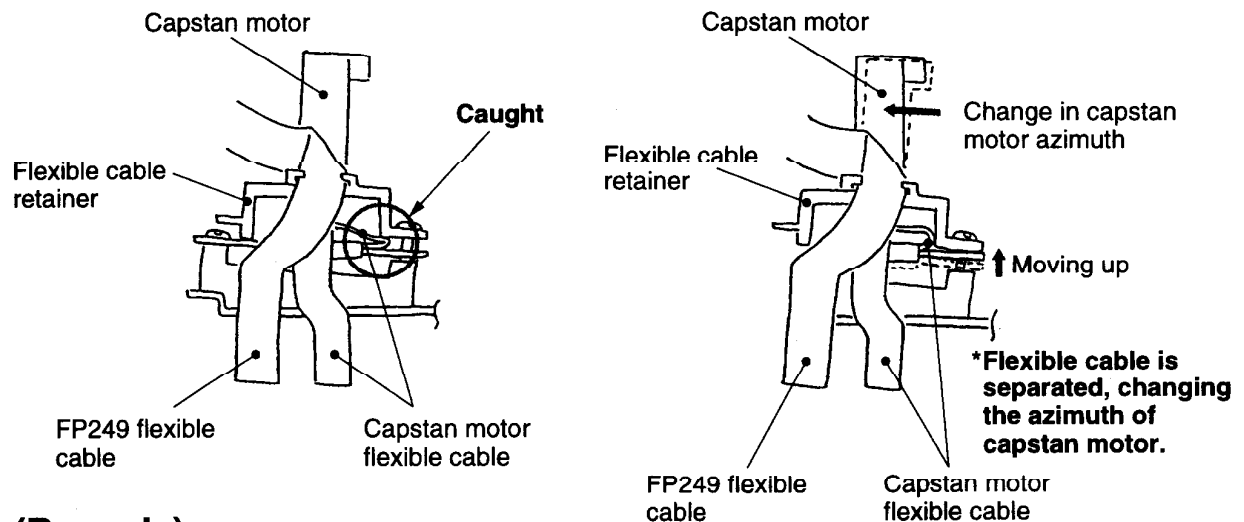
1. Clean the stator.
2. Add rubber spacer. **3-987-953-01**

## (Symptom)

Tape damage/wrinkle due to change in capstan motor azimuth.

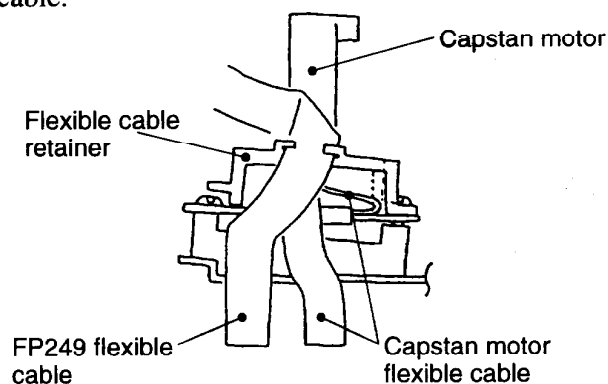
## (Cause)

The folded portion of capstan motor flexible cable is caught and released at the time of assembling the flexible cable retainer, causing tape wrinkle or damage due to change in capstan azimuth and bending of tape.



## (Remedy)

Change the shape of flexible cable retainer to prevent overlap of flexible cable retainer and capstan motor flexible cable.



## (Repair procedure)

Repair flexible cable.



## Failure in loading/unloading operation

### LS arm pin

#### (Symptom)

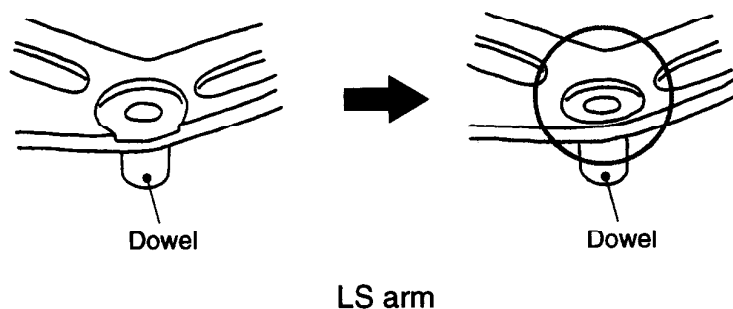
LS arm pin is deformed, causing failure in loading/unloading operation.

#### (Cause)

1. The set was dropped off, causing overload on the dowel of LS arm in the groove of cam gear.
2. LS chassis was forcedly pulled out by user for unloading when unloading failure occurred by tape jamming, caution, etc.
3. LS chassis was pressed forcedly (in the direction of loading) by user during loading/unloading.

#### (Remedy)

1. Change the dowel of LS arm from choked type to forged type.
2. Change the shape of the base at the root of dowel.



#### (Repair procedure)

Replace LS arm **3-965-532-21**

\* Check to see if other parts are deformed.

- ① LS chassis
- ② T soft brake claw
- ③ Tension regulator plate
- ④ LS guide roller

**(Symptom)**

Entrance contact output is small, causing V sync failure and picture distortion.

**(Cause)**

The head projection was lowered to prevent the bending of picture, causing V SYNC failure due to adverse reaction.

**(Remedy)**

Change the projection of drum head.

**(Repair procedure)**

Replace drum ass'y.

**(Symptom)**

Playback output of one CH becomes small due to difference in output of CH1/CH2, causing noise (white noise, dot noise, etc.) in LP picture.

**(Cause)**

The upper drum is tilted due to clearance between drum bearing and shaft, so the height of CH1/CH2 head becomes out of position, causing difference in the pitch of CH1/CH2 of recording pattern and small playback output from one CH, which largely affects LP due to narrow track width even when the amount of pairing slip is the same.

**(Remedy)**

Change the drum bearing and shaft from insertion type to press-in type to prevent inclination due to clearance.

**(Repair procedure)**

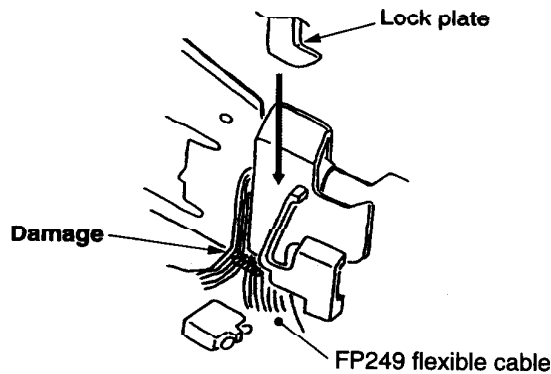
Replace drum ass'y.

**(Symptom)**

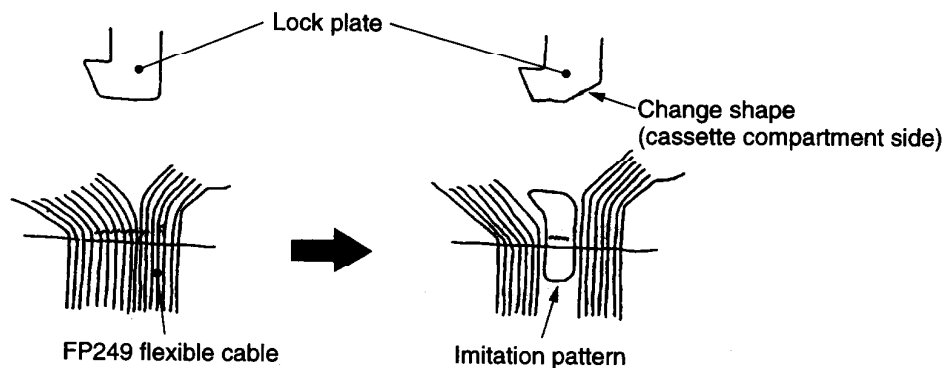
FP249 flexible cable is damaged by cassette compartment lock plate, causing failure in the sensor system for reel rotation detection, C.C. LOCK, etc.

**(Cause)**

Cassette compartment lock plate was pressed to FP249 flexible cable due to over-stroke at cassette compartment DOWN, and FP249 flexible cable was cut off by pressure.

**(Remedy)**

1. Change pattern of FP249 flexible cable to prevent the signal pattern from touching the lock plate.
2. Add imitation pattern to the position in contact with the lock plate of FP249 flexible cable for reinforcement.
3. Change the shape of tip of lock plate to reduce the area of contact with flexible cable.

**(Repair procedure)**

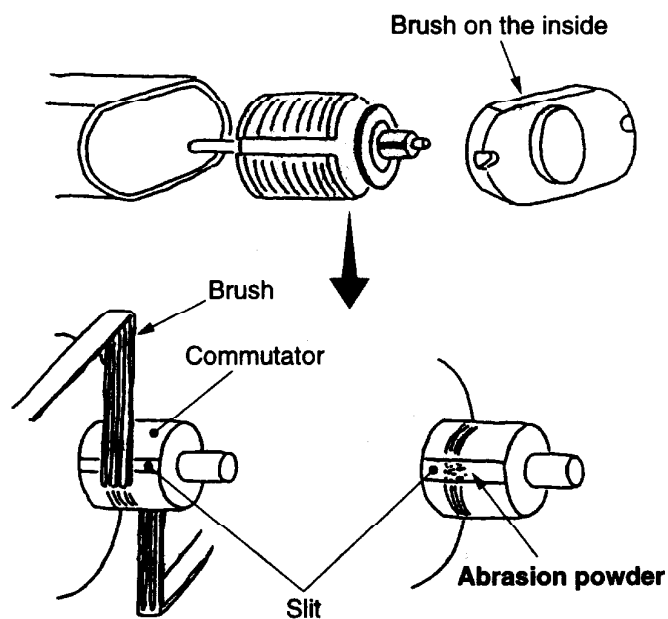
If flexible cable is found damaged by microscope or magnifier, replace chassis (S1) ass'y even when the same trouble does not occur again.

### (Symptom)

Loading motor is not rotating due to short-circuit between slits of loading motor. Fuse blows out (due to short-circuit between terminals) and power cannot be set to ON.

### (Cause)

The slits were shorted by abrasion powder from worn commutator of loading motor and the paint chips on lapping tape dropped off at the time of lapping the commutator, so the brush was contaminated with the mixture of paint chips and contact grease, causing in increase of wear of commutator and short-circuit between slits with the abrasion powder from the worn commutator.



### (Remedy)

1. Introduce ultrasonic cleaning.  
Commutator lapping → Ultrasonic cleaning → Contact grease coating
2. Make arrangement to prevent deposit of foreign objects after coating contact grease.

### (Repair procedure)

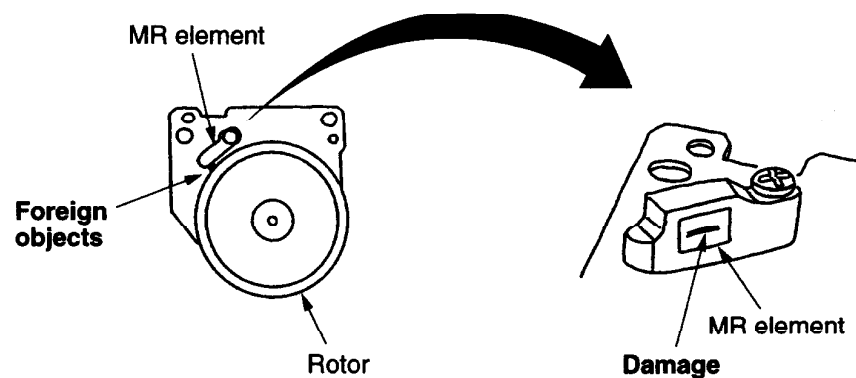
Replace loading motor.

### (Symptom)

Capstan motor rotor is caught and does not rotation due to entry of foreign objects between the rotor and the MR element, causing damage to the surface of MR element, failure of servo operation and runaway of capstan motor.

### (Cause)

1. Metallic objects entered from the opening of cassette compartment or small stones or sands deposited between the rotor and the MR element.
2. Metallic powder from a tap deposited on the rotor when tightening the MD frame screw.



### (Repair procedure)

1. Clean the area between capstan motor and MR element.
2. When MR element is damaged, replace capstan motor.

**31****Separation of guide base no stopper S level to stopper S****(Symptom)**

Guide base is separated when unloading, and is caught at the time of loading/unloading.

**(Cause)**

Stopper was deformed at the time of assembling and guide base was separated due to decrease in the amount of catching the guide arm.

**(Remedy)**

S side ..... Add a dowel to the stopper S to increase the holding force of GB stopper S and its margin at the time of deformation of the guide base.

**(Repair procedure)**

Replace stopper S.

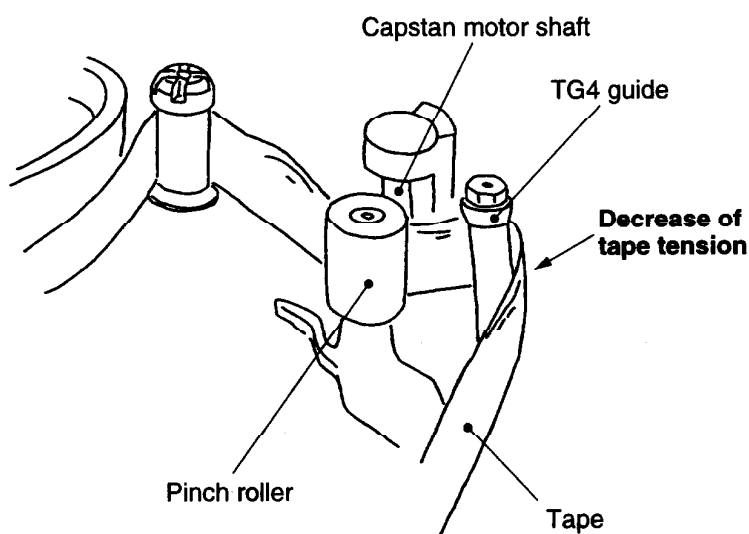
## Break or wrinkle of tape (Due to incorrect adjustment of height of TG4)

### (Symptom)

When the height of tape suddenly changes at reverse operation of CUE/REV mode tape or traveling of tape in reverse direction, the capstan motor shaft and pinch roller do not follow the change at the contact position, so tape is bent and pressed, causing break or wrinkle. Also, tape is slackened at STOP mode (pinch OFF) and the height of tape changes largely, causing tape break or wrinkle even when it is pressed to the pinch roller.

### (Cause)

1. Tape does not travel smoothly over the capstan motor shaft and cannot follow the sudden change in the height of tape in tape travel mode.
2. Tape tension decreases at the upper side near the exit side TG4 guide, causing irregular tape travel.



### (Repair procedure)

- Re-adjust tape path according to the technical news which has been issued.
- Replace TG4 arm ass'y.



# 8mm GENERAL (B MECHANISM)

**SONY.**

テクニカル ニュース  
TECHNICAL NEWS

No. PV-965018

Category SL

Date Jul. 21. 1996

ソニー株式会社 PAVカンパニー  
Sony Corporation PAV Company

件名 (Subject)

## TAPE DAMAGE DUE TO DISCREPANCY IN TG-4 HEIGHT ADJUSTMENT

(Symptom)

When repeatedly switching between PB and REV and between REC and STOP, tape damage as given below might be caused. (Fig. 1)

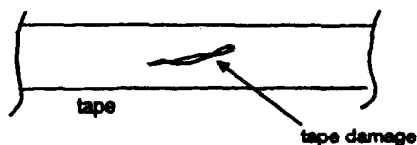


Fig. 1

(Cause)

Discrepancy in the TG-4 height adjustment leads to more deviation of the height of tape running between the capstan and TG-3 in the FWD and RVS directions. This results in tape warp causing tape wrinkle to be produced by the pinch rollers. (Fig. 2)

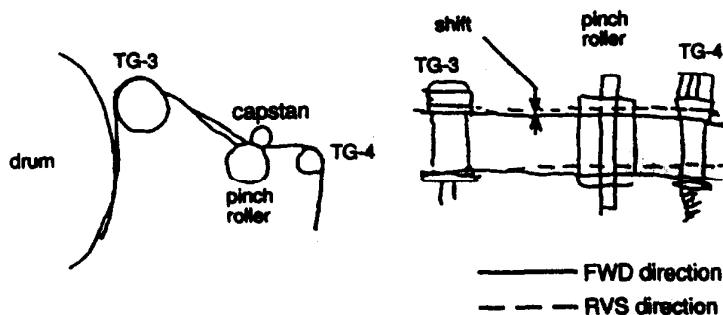


Fig. 2

(Procedure)

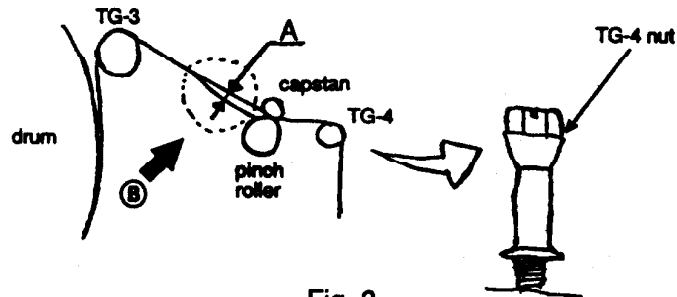
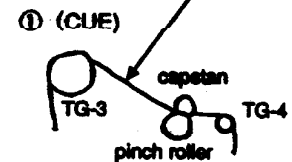
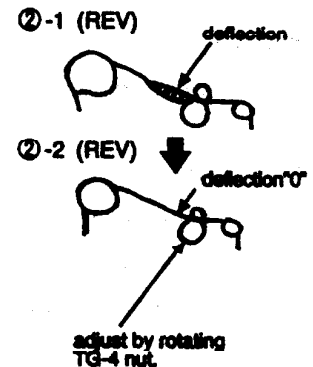


Fig. 3

- ① Run tape (regardless of the tape type) . View the part indicated by the arrow ⑧ from above the MD and place a point of view so that the upper edge and the lower edge of tape are aligned with each other and look like a line ( $A=0$ ) at CUE.



- ② Keep the point of view, perform REV, and adjust the TG-4 height by rotating the TG-4 nut so that the width A produced due to deflection is zero.



- ③ Perform CUE/REV again and verify that the upper and lower edges of the tape are on the same position.

\* If this adjustment cannot be made by rotating the TG-4 nut, the TG-4 nut should be replaced.

- ④ Repeat CUE/REV about 5 times at the tape top portion of E5-120 thin tape (the picture is already recorded) and verify that there is no noise due to tape damage.

# 8 mm B mechanism GENERAL

## SONY

## TECHNICAL NEWS

No. PV-985003  
Category SL  
Date February 13, 1998  
SONY Corporation PAV Company

Subject

**Remedial measures when the trouble "T Reel Does Not Takes Up Tape " occurs (T reel caution)**

### [Symptom]

When the trouble "T Reel Does Not Takes Up Tape " occurs in the type B mechanism, take the following remedial measures.

### [Remedy]

Perform check and repair in accordance with the following the procedures.

#### 1. FWD torque is small

If the FWD torque (measuring T side torque during playback) using torque cassette, is 5 g-cm or less, there is a possibility that the take up torque becomes insufficient due to the torque loss between reel shaft and reel table. Apply oil to the T reel shaft as shown in Fig. 1.

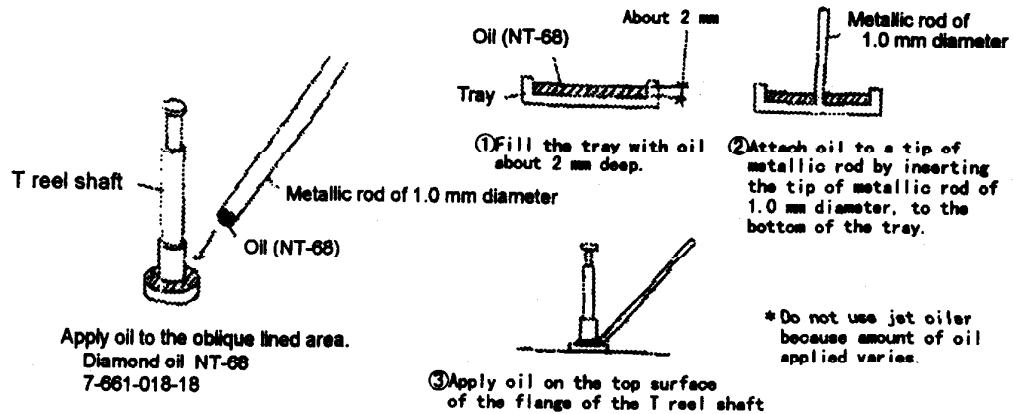
#### 2. Gooseneck retainer is bent

When there are scars on the gooseneck retainer and T reel table as shown in Fig. 2, the gooseneck retainer interferes mechanically with the T reel due to bending of the gooseneck retainer. When there are scars, replace the gooseneck retainer.

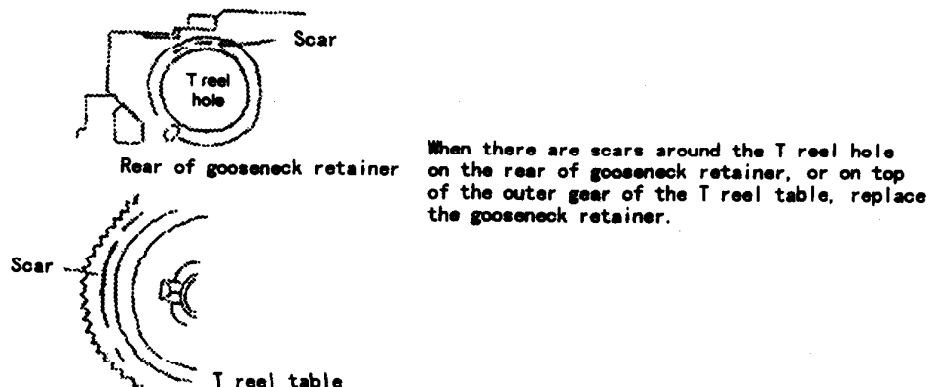
#### 3. T reel height is low

When the trouble "T Reel Does Not Takes Up Tape " occurs in the cases other than the above describe Items 1 and 2, add spacer to the T reel as shown in Fig. 3.

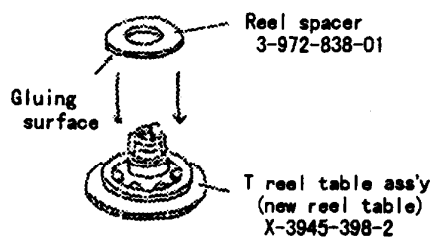
[ Fig. 1 FWD torque is small ]



[ Fig. 2 Gooseneck retainer is bent ]



[ Fig. 3 T reel height is low ]



If tape slack occurs even though the FWD torque and gooseneck retainer are normal, it is anticipated that the T-reel height is low. Therefore, add one piece of reel spacer.

Note: It means to attach an additional spacer with glue to the new reel table that has been informed by Technical News earlier.

# 8 mm B mechanism GENERAL

**SONY**

## TECHNICAL NEWS

No. PV-985045

Category SL

Date September 25, 1998

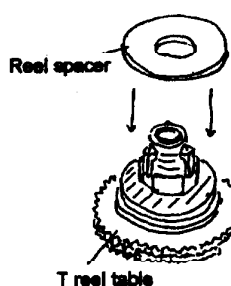
SONY Corporation PAV Company

Subject

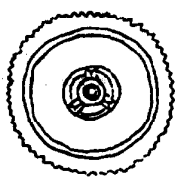
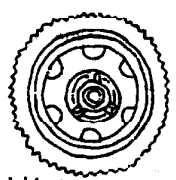

## Unification of Improvements "T. Reel Height Change" for the Trouble of Reel Does Not Wind Tape

### [Content]

For the troubles on market that "reel does not wind tape", the remedial measures are issued by the technical news PV-985016. At present there are three different remedial measures are being introduced to market. The remedial measure for this trouble is unified to the method using the suffix -3 hereafter due to the part supply problem and for improvement of part reliability.

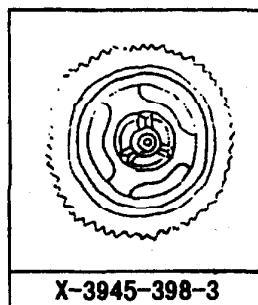


Do not add spacer because reel table height becomes too high. →

Addition of spacer	Applicable (maximum two spacers)	Applicable (maximum one spacer)	Not applicable
Shape of T reel table (The area of double circle in the left figure)			
		Height +0.1	Height +0.1 (total +0.2)
Part number	X-3945-398-1	X-3945-398-2	X-3945-398-3

### [Remedial measure]

Supply of the parts having suffix -1 and -2 is stopped. Part having suffix -3 only is supplied.



# 8 mm B mechanism GENERAL

**SONY**

**REVISED**

No. PV-975028  
Category SL  
Date Aug. 20, 1997

**TECHNICAL NEWS**

SONY Corporation PAV Company

**Subject**

## Specification change of B mechanism reel table torque

This technical news describes the changes related to the reel table torque of B mechanism. Be careful that the torque check method is also changed and becomes different from that of the other existing mechanism deck (such A mechanism).

### (Contents)

Use the following new specification values of reel table torque when it is measured using the torque cassette (GD-2086) in the models using B mechanism.

#### < Takeup side torque >

- Brake torque in RVS mode 7 to 14 g·cm

The RVS mode is the mode in which the EDIT SEARCH “-” is kept depressed during PB PAUSE. The takeup side torque is measured in this mode.

- The torque value in FWD (PB mode) is not checked in B mechanism. (This is the point to be noted.)

Note: The takeup side torque has been measured in the PB mode in the A mechanism.

However, in B mechanism, the takeup side torque is measured only in the RVS mode. In addition to it, the torque value tends to show the lower value in B mechanism when compared with the A mechanism. It has caused the takeup reel table replacement in many cases.

The torque value tends to shown the relatively lower values in B mechanism due to differences of structure and parts. It causes no problem at all. Do not check the takeup side torque using the PB mode in B mechanism.

#### < Supply side torque >

- Back tension in FWD mode (This torque should be checked in PB mode.) 8 to 10.5 g·cm
- Takeup torque in REV mode (The mode in which the REW button is kept depressed after PB) 17 to 35 g·cm.

# 8 mm B mechanism GENERAL

**SONY.**

## TECHNICAL NEWS

No. PV-975031

Category. SL

Date. May, 28, 1997

Sony Corporation PAV Company

Subject

### Remedy when grease is attached to tape

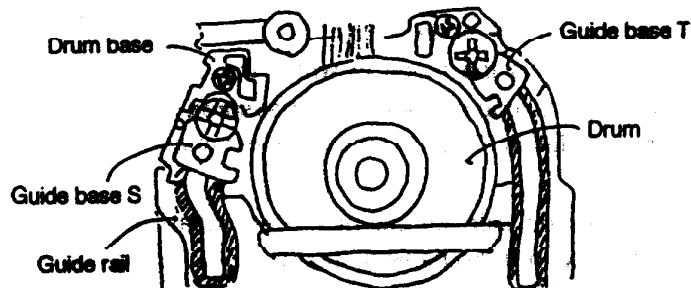
#### (Contents)

When grease which is oozed from type B mechanism of 8 mm, contacts tape, take the following remedy.

#### (Remedy)

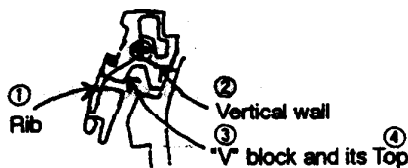
1. Remove grease (by wiping off grease using alcohol). The areas which must be wiped to remove grease, are shown below.

- (1) Clean guide rail and guide base supply/takeup sliding surface of drum base using alcohol.

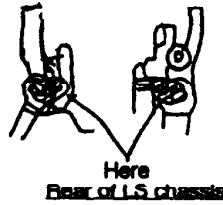


- \* Water drops may be visible at guide base supply/takeup sliding surface of drum base (the areas which are shown by slanted lines in the illustration). The water drops are oil contents which is oozed from grease.

- (2) Clean ① to ④ of supply guide base using alcohol.



- (3) Remove LS chassis block assembly and remove grease from it using alcohol.  
Supply and takeup guide base stopper block: two areas



2. Grease is changed. (Changed to grease SG-941 which has small amount of ooze.)

Former		New
SG-055G (green)	→	SG-941 (blue)
7-651-000-09		7-662-001-39